

**ANALYSIS OF ITEM AND TEST INFORMATION FUNCTIONS OF
SENIOR SCHOOL CERTIFICATE EXAMINATIONS IN ECONOMICS
IN NORHT-CENTRAL, NIGERIA**

BY

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00/250C171

Educational Research, Measurement and Evaluation

**A Ph. D. THESIS PRESENTED TO THE DEPARTMENT OF SOCIAL
SCIENCES EDUCATION, FACULTY OF EDUCATION, UNIVERSITY
OF ILORIN, ILORIN, NIGERIA IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY
(PH. D) IN EDUCATIONAL RESEARCH, MEASUREMENT AND
EVALUATION**

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CERTIFICATION

This is to certify that this study titled “Analysis of Item and Test Information Functions of Senior Secondary School Certificate Examination Economics in North-central, Nigeria” was carried out by SULYMAN, Rasaq, (00/25OC171) and has been read and approved as meeting part of the requirement of the Department of Social Sciences Education, Faculty of Education, University of Ilorin, Ilorin, Nigeria for the award of Doctor of Philosophy Degree (Ph. D.) in Educational Research, Measurement and Evaluation.

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DEDICATION

This research is dedicated to Almighty Allah, and the Prophet Muhammed (SAW) as well as his Purified Household (A.S).

ACKNOWLEDGEMENTS

All praises and adoration are due to Almighty Allah (S.W.T), the creator and the sustainer of the universe, for making it possible to attain Ph. D. degree. I thank Him for making my academic pursuit a reality. May peace of Allah be upon the soul of Prophet Muhammed (SAW) and his purified Alhul-bayt (A.S) till the day of judgement.

I sincerely appreciate my supervisor Prof. Bolanle O. Olawuyi for her intellectual contribution, encouragement and relentless effort which made the successful completion of this work a reality. I equally appreciate my former supervisor D r. A. A. Ogunlade whose contribution continue till stage of post field. I also appreciate the intellectual contribution of the Head of Department of Social Science Education, University of Ilorin, Ilorin Nigeria, Prof. R.W. Okunloye. I am indebted to Prof. H. O. Owolabi for his encouragement, relentless effort, intellectual input and his fatherly and professional advice from time to time which contributed immensely to the successful completion of this study. I sincerely acknowledge the contributions of Prof. M.F Salman my internal external examiner. I pray God in His infinite mercy be with you always. The success of this work is also credited to the inspiration received from Professors. O. E. Abdullahi, F.A. Olasehinde-Williams, I O. O. Amali and A.A. Jekayinfa. I wish to appreciate the contributions and support of the following staff: Dr. (Mrs.) H.T. Yusuf ([Postgraduate coordinator), M.B. Bello, D.S. Daramola, A. O. Balogun, A.A. Abdulsalam, and M.I. Jimoh, I. N. Olokoba and R. K. Oniye, Mrs I.N. Balogun, Dr. J. Oladele, Mrs. L.S. Akinsemoyin, other lecturers and non-academic staff of the Department of Social Sciences Education and lecturers in the Department of Adult and Primary Education, University of Ilorin, Ilorin.

I am grateful to my parents Mallam Sulyman Laro Ishola and Alhaja Sulyman Zainab. May the Almighty Allah continue to be with them and reward them in this world and hereafter for caring for me from childhood till Present. I also express my gratitude to my siblings Jamiu, Dr Yusuf. A. Muritala, Baliqees, Abudulkabir, Fadilah, Toafeeq and Ganiyah. The concerned my cousin, Abdulrasheed, and Abdulwasiiu, are also appreciated. May Allah be with them in all their endeavors.

I sincerely acknowledge the contributions of Dr. M.O. Ogunjimi, Mr. Adio Abdullah, the vice principal ICHOS, Ilorin and the entire staff of ICOHS, Ilorin. My friends and colleagues at work Mr. Azeez, Oyedokun M.O, Abubakar A.R, Abdulmutalib S.A, Mrs Osasona, Oyewole, Abdulsalam, Kafayat, Ogunbeku B, Adamu C.A, Jimoh, A. K and all others. I extend my

appreciation to Bako Monsurah and Alao Barakat for typing this thesis as well as Abdulsemiu Monsurah and Muhammed Rabiah and other students of ICOHS Ilorin who have contributed in one way or the other to the successful completion of the programme. My colleagues, Dr. Abdulsalam–Nuhu R.O, Tosin Arokunyo, T.O Akano, Abdulmumin Yekeem, Dr. J. Mahmud, Dr. Adewuni, M.O. Aderinto, K. E. Paul, Peter, A. Cobina, Osho. A. and Dr. Metibemu Adeshola. Haliru Shola, Dr. Aliu .A. O. and others who contributed in one way or the other to the success of this programme are also appreciated. May Allah reward you accordingly.

Finally, I sincerely appreciate the prayer and support of my wife Mrs Abdulrasaq Aisah and children, Muhammad –Baqir, Ali-sajjad, Abbas, Fatimah and Maryam for their sacrifices, patience and understanding displayed during the period of my studies. May the Almighty Allah bless them all.

I sincerely appreciate the contributions of my mentor Uztaz A.M Berende, and the entire member of Madinatul-Ilm Academy, Ilorin toward the success of this programme.

Sulyman, Rasaq

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ABSTRACT

Economics prepares one to deal with issues in a variety of fields and prepares individuals for future career prospects, investment decisions and retirement strategies. The 2013 and 2014 WASSCE Economics performance recorded a significant variance with the former performing better than the latter; and this is a source of worry to educationists. This variation may be as a result of quality of test items, composition of different items formats in the test and ability distribution of the examinees. Thus, this study aimed at analyzing the items and test information functions of Senior School Certificate Examination in Economics in North-central, Nigeria. The objectives of this study were to determine: (i) the dimensionality of 2013 WASSCE Economics objective test items; (ii) the dimensionality of 2014 WASSCE Economics objective test items; (iii) the item information function of 2013 WASSCE Economics objective items; (iv) the item information function of 2014 WASSCE Economics objective items; (v) the test information function of 2013 WASSCE Economics objective test items; (vi) the test information function of 2014 WASSCE Economics test items; and (vii) the relative efficiency of the 2013 and 2014 WASSCE Economics test items.

The study employed the descriptive survey design. The population comprised all 133, 153 senior secondary school three (SS3) students in the North-central zone of Nigeria. The target population was all senior school three (SS3) students that offered Economics in their Senior School Certificate Examinations (SSCE). A sample of 1,120 students was drawn from 32 senior secondary schools in North-central, Nigeria. Multistage sampling procedures involving simple random, proportionate and purposive sampling techniques were used to select the sample. The research instruments were WASSCE 2013 and 2014 Economics paper 1, Percentage, Mean, Parallel analysis and Multidimensional Item Response Theory (MIRT) information indices were employed to analyse the data gathered for the study at 0.05 level of significance.

The findings of the study were that the:

1. 2013 WASSCE Economics objective test measured multidimensional traits reflecting 4 dimensions;
2. 2014 WASSCE Economics objective test measured multidimensional traits reflecting 2 dimensions;
3. 2013 WASSCE Economics objective items provide less information with mean of 0.73;
4. 2014 WASSCE Economics objective items provide least information with mean of 0.56;
5. 2013 WASSCE Economics test measured the precision of 17.5% of the examinees that took the test;
6. 2014 WASSCE Economics test measured the precision of 5.4% of the examinees that took the test; and
7. 2013 and 2014 WASSCE Economics test items were less informative, but the 2013 WASSCE Economics test items was relatively more informative than that of 2014 items.

The study concluded that items and tests of 2013 and 2014 WASSCE Economics were good and of the same standard. The implied that Economics items used for the assessment possessed the same multidimensional traits. The study recommended that Examination bodies can re-use the 2013 and 2014 WASSCE Economics items for future examinations.

Word Count: 474

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Appendix I
ECONOMICS ACHIEVEMENT TEST (EAT I)
PAPER 1
OBJECTIVE TEST

Answer all the questions

Each question is followed by **four** options lettered A to D. Choose the correct option for **each** question and write the option on your answer sheet. Give only **one** answer to **each** question.

1. Human wants are unlimited
 - A. production is inadequate.
 - B. resources have alternative uses.
 - C. new wants always arise.
 - D. resources are limited
2. A basic economics problem of any society is
 - A. high level of illiteracy
 - B. irregular power supply
 - C. population growth
 - D. resources allocation
3. In a centrally planned economy, what to produce is
 - A. determined by the forces of demand and supply
 - B. driven by profit motive
 - C. determined by consumers
 - D. the responsibility of state's bureaucrats.
4. Which of the following is related to resources allocation in an economy?
 - A. How to produce
 - B. What to produce
 - C. For whom to produce
 - D. Efficient use of inputs
5. Which of the following is **not** a feature of socialism?
 - A. Collective ownership of productive resources
 - B. Freedom of enterprise
 - C. Production is not based on the profit.
 - D. Maximize their satisfaction.
6. Households make economic decision because they want to
 - A. make more profit.
 - B. increase their salaries and wages.
 - C. increase their purchase.
 - D. maximize their satisfaction.

7. State owned enterprises are **more** common in
 - A. centrally planned economies.
 - B. mixed economies.
 - C. capitalist economies.
 - D. developed economies.
8. A normal supply curve has a positive slope indicates that
 - A. sellers are willing to sell more at a lower price.
 - B. sellers are indifferent to price.
 - C. sellers are willing to sell more at a higher price.
 - D. there is always a fixed supply.
9. To control inflation, the central bank of a country may adopt
 - A. an expansionary monetary policy.
 - B. a restrictive monetary policy.
 - C. an increased wage policy.
 - D. a deficit financing policy.
10. Disposable income is the income earned
 - A. by the nationals of a country resident within the country.
 - B. from productive activities of nationals of a country both at home and abroad.
 - C. when personal income tax is deducted from personal income.
 - D. when the gross income of an individual is added to personal income tax.
11. Livestock production in West Africa is hindered **mainly** by
 - A. inadequate demand.
 - B. use of traditional implements.
 - C. land tenure system.
 - D. pests and disease.
12. The components of a three sector economy are
 - A. banks, schools and hospitals.
 - B. workers, producers and marketers.
 - C. households, firms and the government
 - D. producers, retailers and wholesalers
13. A declining population is one in which the population is
 - A. experiencing a high rate of emigration.
 - B. made up of large numbers of old people.
 - C. not producing enough goods.
 - D. not contributing enough to the national income.

14. Which of the following agencies help to stabilize farmers' income?
- A. Local government authorities B. Trade unions
C. Marketing boards D. Co-operative organization
15. Other things being equal, an increase in supply will lead to
- A. a fall in price and an increase in quality bought and sold.
B. an increase in price and increase in quality bought and sold.
C. a fall in price and a fall in quality bought and sold.
D. an increase in quality supplied and demanded only.
16. Example of joint stock banks are
- A. commercial banks. B. co-operative credit societies.
C. central banks. D. development banks
17. Which of the following is **not** a characteristic of a developing country? High
- A. real per capita income B. level of primary production
C. population growth rate D. level of illiteracy
18. Goods consumed out of habit have
- A. elastic demand. B. perfectly elastic demand.
C. inelastic demand. D. unitary elastic demand.
19. Which of the following items is not a recurrent expenditure?
- A. Building of school and colleges B. Maintenance of school buildings
C. Payment of teacher 'salaries D. Purchase of stationery for examinations
20. If the coefficient of price elasticity of demand is 0.1, demand is
- A. elastic B. inelastic C. zero elastic D. unitary
elastic,
21. The profit of a producer is the difference between
- A. total cost and marginal cost B. total revenue and total cost

- C. average cost and total cost D. price and total cost
22. The rate of increase in utility is
- A. average utility. B. increasing utility C. total utility D. marginal utility
23. The supply of tea is linearly presented as $P=0.2Q$, where P is the price and Q is the quantity. What is P when Q= 25?
- A. \$ 0.08 B. \$ 5.00 C. \$ 25.02 D. \$ 125
24. Increasing in supply due to changes in plant size will take place only in the
- A. normal time. B. long run C. market period D. short run
25. The long run average cost curve is made up of several short-run
- A. marginal and average cost curves B. average cost curve
- C. average variable cost curve D. average variable and total cost curves

Use the table below to answer question 26 and 27

X	2	3	4	5
F	2	5	2	1

26. From the table, the mean of the distribution is
- A. 2.2 B. 2.5 C. 3.2 D. 4.5
27. What is the median of the distribution?
- A. 5 B. 4 C. 3 D. 2
28. Co-operative society formed to market the output of their member are called
- A. consumer's co-operative societies B. wholesale co-operative societies
- C. credit and thrift co-operative societies D. producer' co-operative societies
29. Money will serve as a standard of deferred payment if it is
- A. homogeneous B. durable C. easily recognized D. stable in value

30. Due to an increase in price, seller increases the quantity offered for sale from **400 units** to **450 units**. What is the percentage change in quantity supplied?
- A. 1% B. 7.5% C. 12.5% D. 20%
31. Which of the following will increase the nominal value of national income?
- A. high rate of inflation B. increase in the value of money
C. increase in import D. high rate of subsistence production
32. Cyclical unemployment is one associate with
- A. inadequate information B. trade fluctuation C. structural changes
D. seasonal changes
33. Which of the following **best** define inflation?
- A. cyclical increase in prices B. periodic increase in prices
C. persistent increase in prices D. occasional increase in price
34. Perfect knowledge of event in a perfect market will be made possible by the existence of
- A. many buyer and sell B. homogeneous products
C. means of communication D. large number of traders.
35. An increase in the price of a commodity for **\$10** to **\$15** lead to an increase in the quantity supplied from **10 units** to **15 units**. The price elasticity of supply is
- A. 0 B. 0.5 C. 1. D. 5.
36. Economics development may be hindered if there is
- A. a high pool of skilled labour B. a high rate of economic growth.
C. political stability D. rapid population growth
37. Which of the following types of unemployment result from changes in the pattern of aggregate demand?
- A. technological unemployment B. structural unemployment

- C. frictional unemployment D. seasonal unemployment
38. Which of the following is not a reason countries import goods?
- A. different in natural endowments B. the law of absolute advantage
- C. different in tastes D. the love for other nation
39. Provision of short term loans to solve balance of payments problems is done by the
- A. International Finance Corporation B. International Monetary Fund.
- C. International Bank for Reconstructed and Development
- D. African Development Bank
40. West African countries are experience worsening terms of trade because
- A. they are primary producer B. their currencies are overvalued
- C. they import less machines D. they are tertiary producers
41. Which of the following statement is correct?
- A. as total unit utility increases, the marginal utility also increases
- B. the marginal utility is always zero whenever the total utility reaches the maximum
- C. the total utility is at maximum whenever marginal utility is at its maximum
- D. there is no relationship total utility and the marginal utility
42. A change in the quantity demanded of a given commodity is determined by the
- A. size of the population B. income of the consumer
- C. price of the commodity D. taste and fashion
43. The likely implication of the devaluation of a country's currency is that
- A. export of such a country become cheaper
- B. importation of goods into such a country become cheaper
- C. the value of such a country's currency rises
- D. foreign good are attracted into the country

44. International trade is desirable because it
- A. may lead to over production
 - B. brings about over-dependence of countries of one another
 - C. provides foreign market for local goods
 - D. brings about unhealthy competition and rivalries.
45. A financial institution established for the purpose of providing specialized like acceptance of bill of exchange and equipment leasing is known as
- A. merchant bank
 - B. development bank
 - C. central bank
 - D. insurance bank
46. Which of the following functions of money is mostly likely affected during inflation?
- A. medium of exchange
 - B. unit of account
 - C. store of value
 - D. standard of deferred payment
47. Precautionary motive for holding money is to
- A. meet daily and regular transactions
 - B. take advantages of changes in the price of goods and services
 - C. cover unforeseen events
 - D. cover expenses on house rent
48. Which of the following measures will not encourage industrialization in West Africa?
- A. taking over of all forms of industries by the government
 - B. provision of social infrastructure
 - C. giving tax incentives, especially to infant industries
 - D. using tariffs to discourage the use of imported items
49. The concentration of many firms of a particular industry in a particular area is known as
- A. location of industry
 - B. amalgamation of industries
 - C. localization of industry
 - D. nationalization of industry
50. Which of the following is not an effect of the discovery of mineral resources in an area?
- A. increase in wealth
 - B. Overcrowding
 - C. increase in crime rate
 - D. under population

Appendix II
ECONOMICS ACHIEVEMENT TEST (EAT II)
PAPER 1
OBJECTIVE TEST

Answer all the questions

Each question is followed by **four** options lettered A to D. Choose the correct option for **each** question and write the option on your answer sheet. Give only **one** answer to **each** question

1. The action of government to forgo road construction in order to provide more health facilities denotes
 - (a) sound economic decision
 - (b) opportunity cost.
 - (c) Practicable government policy
 - (d) scale of preference.
2. In economics, a market is defined as any
 - (a) agreement made for consumers to buy all they need.
 - (b) Agreement to sell commodities at low price.
 - (c) Agreement made for producers to sell all their goods.
 - (d) Agreement whereby the buyers and sellers are in contact.
3. Which of the following is not a function of an insurance company?
 - (a) pooling resources together against risks
 - (b) mobilization of funds through premiums collected
 - (c) encouragement of investment by security of capital
 - (d) collection of deposits from the public for investment
4. A debenture holder cares
 - (a) commission
 - (b) profits
 - (c) fixed interest.
 - (d) quasi-rent
5. All economic systems must decide what to produce because
 - (a) resources are not available
 - (b) consumers want maximum satisfaction.
 - (c) resources are limited in supply
 - (d) producers want maximum profit,

6. Trade between two countries is known as
 - (a) bilateral trade
 - (b) unilateral
 - (c) multilateral trade.
 - (d) Internal trade.
7. In the balance of payments of a country, tourism is classified under
 - (a) capital account
 - (b) invisible trade
 - (c) merchandise trade
 - (d) official reserves
8. General rise in the price level induced by increased price of inputs is referred as
 - (a) run-away inflation
 - (b) cost-push inflation
 - (c) demand-pull inflation
 - (d) imported inflation
9. Which of the following is a function of merchant banks?
 - (a) acting as banker's bank
 - (b) lending to the commercial bank as a last resort
 - (c) controlling inflation in the economy
 - (d) underwriting and issuing of shares
10. Demand is elastic when percentage change in
 - (a) quantity demanded is greater than percentage change in price.
 - (b) Price is greater than percentage change in quantity demanded.
 - (c) Price is equal to one.
 - (d) quantity demanded is zero
11. A budget is balanced when expected total revenue is
 - (a) greater than expected expenditure
 - (b) less than total expenditure
 - (c) equal to expected expenditure.
 - (d) greater than total expenditure
12. A co-operative society is a
 - (a) finance house
 - (b) self-help business organization
 - (c) public corporation.
 - (d) non-democratic business organization
13. The value of money is affected by the
 - (a) speculative motive.
 - (b) Price level

- (c) precautionary motive (d) intervention of development banks.
14. Which of the following is a function of money?
- (a) medium of communication (b) measure of securities
- (c) store of wealth (d) discounting bills of exchange
15. Which of the following is an asset of a commercial bank?
- (a) reserve funds (b) shareholder's capital (c) customer's deposits (d) treasury bills
16. An increase in the supply of a commodity X automatically results in an increase in the supply of another commodity Y. This is case of
- (a) elastic supply (b) joint supply (c) exceptional supply (d) competitive supply
17. Why would an individual increase his level of consumption during inflationary periods? (a) The real value of any amount saved falls over time.
- (b) Interest rates are generally low.
- (c) There are varieties of goods to buy.
- (d) wages and salaries stagnate during inflation.
18. The types of monopoly that develops as a result of uneven distribution of resources is called
- (a) legal monopoly (b) natural monopoly (c) state monopoly (d) international monopoly
19. A major disadvantage of partnership form of business is that
- (a) every partner to be consulted during decision making
- (b) partners could be too friendly with their customers
- (c) affairs can be kept private. (d) partners could take long holidays
20. Goods which have to be paid for are known as
- (a) physical goods (b) economic goods (c) free goods (d) intangible goods
21. Goods are used to be in competitive demand when they are

- (a) substitutes (b) complementary (c) jointly demanded (d) identical
22. In the long run, factors of production are considered to be
- (a) at maximum (b) fixed (c) variable (d) increasing
23. Which of the following will shift the demand curve for cocoa to the right?
- (a) An increase in consumer's income (b) A rise in the price of cocoa
(c) A take on cocoa producers (d) A fall in the quantity demanded of cocoa
24. An agricultural production process which uses more machinery relative to labour is referred to as
- (a) large scale farming (b) capital intensive farming
(c) commercial farming (d) land intensive farming
25. Which of the following will enhance productivity in an economy?
- (a) the use of obsolete capital (b) technological change
(c) expansion of land under cultivation (d) an increase in the labour force
26. Post-harvest losses in west African countries can be reduced if
- (a) the land tenure system could be reformed
(b) more irrigation schemes could be provided
(c) better storage facilities could be provided
(d) erosion is controlled
27. Which of the following best explains what to produce?
- (a) how much goods are to be produced (b) the combination of resources to be used
(c) which goods and services to be produced (d) how many wants are to be satisfied
28. The demand for money is described as a
- (a) competitive demand (b) joint demand (c) derived demand (d) composite demand

29. Which of the following is the main outcome of a trade union's interference with the wages rate? wages are
- (a) lowered but more employment opportunities are created
 - (b) lowered but employment level remains unchanged.
 - (c) increased and employment levels are unchanged
 - (d) increased but employment levels are reduced
30. The introduction of tariffs and quotas
- (a) reduce the prices of imports
 - (b) increase the demand for locally made goods
 - (c) discourage domestic industries from becoming more efficient
 - (d) reduce the prices of locally made goods.
31. A government that want to get more revenue will increase the tax on commodities with
- a (a) high price elasticity of demand (b) low price elasticity of demand
 - (c) high income elasticity of demand (d) low income elasticity of demand.
32. Which of the following is involved in the money markets?
- (a) building society (b) development bank (c) commercial banks (d) stock exchange
33. Demand pull inflation can aptly be described as
- (a) inflation induced by rising costs of production
 - (b) reduction in government expenditure
 - (c) persistent rise in prices due to increase in expenditure
 - (d) massive importation of goods from a country with hyperinflation
34. In order to develop the banking habit of rural dwellers, the traditional money lenders should be
- (a) proscribed (b) legalized (c) subsidized (d) heavily taxed

35. All rates of interest in a country are influenced by the
- (a) bank rate (b) population growth rate (c) wage rate (d) mortgage rate
36. Exchange control is a weapon used in regulating
- (a) barter trade (b) stock exchange (c) foreign trade (d) internal trade
37. When the marginal product is negative, the total product will be
- (a) constant (b) at a maximum (c) increasing (d) decreasing
38. Physical productivity is affected by all the under listed factors excepted the
- (a) state of technology (b) quantity of inputs (c) quality of inputs (d) price of output
39. If a commodity has a high marginal utility, its market price will be -----
- (a) stable (b) high (c) zero (d) constant
40. Price fluctuation is a feature of
- (a) common market (b) imperfect market (c) supermarkets (d) market failure
41. Which of the following statements is not a feature of a monopoly?
- (a) seller is allowed to fix his own price (b) buyers and seller are price takers
- (c) new entrances are restricted (d) there is only seller of the commodity
42. The following are advantages of sole proprietorship except
- (a) quick and easy decision making (b) keeping its business affairs private.
- (c) assurance of raising huge capital for expansion (d) high level of commitment
43. Which of the following controls a limited liability company?
- (a) the general manager (b) the managing director (c) tax payers (d) the board of directors

44. Given that $Q_d = 80 - 2p$ where Q_d is quantity demanded and P is price, what quantity would be demanded when the price (P) is \$3?
- (a) 86 units (b) 80 units (c) 76 units (d) 74 units
45. Which of the following can be used to calculate the price elasticity of demanded?
- (a) percentage change in quantity demanded
Percentage change in price
- (b) Percentage change in price
percentage change in the quantity demanded
- (c) percentage change in the quantity demanded
percentage change in income
- (d) percentage change in income
percentage in the quantity demanded
46. The main advantage of large scale production is that
- (a) unit cost of production falls (b) decision making is quick
- (c) worker-management relationship is improved (d) the quality of the product increase
47. Which of the following items is not included in measuring national income by income approach?
- (a) Profits of companies (b) Rents on property (c) Students' grants and scholarship
- (d) Wages and salaries of public servants
48. Gold, diamond, irons ore and limestone are collectively referred to as
- (a) human resources (b) mineral resources (c) artificial resources (d) forest resources
49. Point's outside a production possibility curve indicate

- (a) unattainable production levels (b) attainable
(C) inefficient, but attainable production level (d) optimum production levels.

50. The international bank for reconstruction and development (**IBRD**) is important to developing nations because it

- (a) gives aid for defense. (b) offers loans for public projects (c) offers aid to finance private projects. (d) Lives loans for legal proceeding.

Appendix III
2013 WASSCE TEST INFORMATION FUNCTION

ID	Info	ID	Info	ID	Info	ID	Info	ID	Info	ID	Info	ID	Info	ID	Info
1	0.81	2	7.79	3	153.15	4	0.86	5	0.92	6	5.33	7	2.67	8	0.41
9	0.42	10	0.98	11	0.41	12	0.40	13	1.73	14	1.52	15	1.14	16	21.04
17	20.18	18	1.15	19	1.15	20	7.79	21	0.41	22	0.62	23	0.41	24	0.41
25	1.15	26	0.42	27	7.78	28	0.41	29	1.70	30	0.83	31	0.81	32	8.03
33	0.38	34	0.62	35	1625.21	36	0.58	37	2.35	38	0.42	39	0.73	40	48.16
41	18.61	42	0.77	43	43.80	44	40.04	45	7.78	46	2145.45	47	2.90	48	41.95
49	0.41	50	1.38	51	7.78	52	40.04	53	735.63	54	0.39	55	37.91	56	7.78
57	0.77	58	462.36	59	0.40	60	1.14	61	0.41	62	8.66	63	18.59	64	0.77
65	1.44	66	1.14	67	0.56	68	0.40	69	0.91	70	0.85	71	0.39	72	1.15

73	0.40	74	18.59	75	424.05	76	18.59	77	20.18	78	1.14	79	8.66	80	20.18
81	7.79	82	0.39	83	1.15	84	1.72	85	184.79	86	2.80	87	0.40	88	1.16
89	1190.53	90	20.18	91	7.78	92	0.39	93	13.99	94	0.39	95	0.98	96	1.41
97	432.99	98	1.52	99	0.41	100	0.81	101	1.19	102	7.78	103	0.81	104	7.79
105	153.15	106	0.41	107	0.92	108	5.33	109	2.67	110	0.41	111	0.42	112	0.98
113	0.41	114	0.40	115	1.73	116	1.52	117	1.14	118	21.04	119	20.18	120	1.15
121	1.15	122	7.79	123	0.41	124	0.62	125	0.41	126	0.41	127	1.15	128	0.42
129	7.78	130	0.41	131	1.70	132	0.83	133	0.81	134	0.81	135	7.79	136	153.15
137	0.41	138	0.92	139	5.33	140	2.67	141	0.41	142	0.42	143	0.98	144	0.41
145	0.40	146	1.73	147	1.52	148	1.14	149	21.04	150	20.18	151	1.15	152	1.15
153	7.79	154	0.41	155	0.62	156	0.41	157	0.41	158	1.15	159	0.42	160	7.78
161	0.41	162	1.70	163	0.83	164	0.81	165	0.81	166	7.79	167	153.15	168	0.41
169	0.92	170	5.33	171	2.67	172	0.41	173	0.42	174	0.98	175	0.41	176	0.40
177	1.73	178	1.52	179	1.14	180	21.04	181	20.18	182	1.15	183	1.15	184	7.79
185	0.41	186	0.62	187	0.41	188	0.41	189	1.15	190	0.42	191	7.78	192	0.41
193	1.70	194	0.83	195	0.81	196	0.81	197	8.03	198	0.38	199	0.62	200	1625.21
201	0.58	202	2.35	203	0.42	204	0.73	205	48.16	206	18.61	207	0.77	208	43.80
209	40.04	210	7.78	211	2145.45	212	2.90	213	41.95	214	0.41	215	1.38	216	7.78
217	40.04	218	735.63	219	0.39	220	37.91	221	7.78	222	0.77	223	462.36	224	0.40
225	1.14	226	0.81	227	8.03	228	0.38	229	0.62	230	1625.21	231	0.58	232	2.35
233	0.42	234	0.73	235	48.16	236	18.61	237	0.77	238	43.80	239	40.04	240	7.78
241	2145.45	242	2.90	243	41.95	244	0.41	245	1.38	246	7.78	247	40.04	248	735.63
249	0.39	250	37.91	251	7.78	252	0.77	253	462.36	254	0.40	255	1.14	256	0.81
257	8.03	258	0.38	259	0.62	260	1625.21	261	0.58	262	2.35	263	0.42	264	0.73
265	48.16	266	18.61	267	0.77	268	43.80	269	40.04	270	7.78	271	2145.45	272	2.90
273	41.95	274	0.41	275	1.38	276	7.78	277	40.04	278	735.63	279	0.39	280	37.91
281	7.78	282	0.77	283	462.36	284	0.40	285	1.14	286	2.42	287	0.41	288	2.80

289	0.40	290	1.16	291	1190.53	292	20.18	293	7.78	294	0.39	295	13.99	296	0.39
297	0.98	298	1.41	299	0.39	300	13.99	301	0.39	302	0.98	303	1.41	304	1190.53
305	20.18	306	7.78	307	0.39	308	13.99	309	0.39	310	2986.06	311	4.04	312	1126.89
313	6.20	314	1725.46	315	2.06	316	163.33	317	3.56	318	2342.16	319	9.32	320	0.76
321	0.39	322	0.67	323	20.21	324	18.61	325	29.33	326	7.65	327	64.92	328	387.26
329	0.76	330	2662.74	331	90.52	332	1.14	333	0.41	334	20.18	335	791.44	336	1.72
337	1.14	338	471.78	339	0.83	340	0.77	341	0.95	342	1.15	343	0.42	344	1.26
345	0.40	346	1.14	347	0.39	348	98.70	349	494.39	350	4.20	351	1.96	352	0.61
353	24.84	354	7.47	355	7.29	356	24.84	357	5.75	358	24.83	359	15.21	360	8.31
361	1.58	362	73.93	363	16.57	364	3.01	365	2657.64	366	69.82	367	2.74	368	2268.56
369	33.04	370	0.53	371	1.66	372	118.77	373	20.18	374	8.05	375	1445.28	376	1.13
377	1.38	378	1.01	379	1.02	380	2.06	381	0.74	382	1.25	383	0.73	384	0.39
385	378.54	386	0.83	387	0.39	388	5.96	389	1434.50	390	21.60	391	1.14	392	21.58
393	163.64	394	5.42	395	2.31	396	21.58	397	0.41	398	890.83	399	2.31	400	21.58
401	1.41	402	1190.53	403	20.18	404	7.78	405	0.39	406	13.99	407	0.39	408	2986.06
409	4.04	410	1126.89	411	6.20	412	1725.46	413	2.06	414	163.33	415	3.56	416	2342.16
417	9.32	418	0.76	419	0.39	420	0.67	421	20.21	422	18.61	423	29.33	424	7.65
425	64.92	426	387.26	427	0.76	428	2662.74	429	90.52	430	1.14	431	0.41	432	20.18
433	791.44	434	20.18	435	791.44	436	1.72	437	1.14	438	471.78	439	0.83	440	0.77
441	0.95	442	1.15	443	0.42	444	1.26	445	0.40	446	1.14	447	0.39	448	98.70
449	494.39	450	4.20	451	1.96	452	0.61	453	24.84	454	7.47	455	7.29	456	24.84
457	5.75	458	24.83	459	15.21	460	8.31	461	1.58	462	73.93	463	16.57	464	3.01
465	2657.64	466	69.82	467	2.74	468	2268.56	469	33.04	470	0.53	471	1.66	472	0.53
473	1.66	474	118.77	475	20.18	476	8.05	477	1445.28	478	1.13	479	1.38	480	1.01
481	1.02	482	2.06	483	0.74	484	1.25	485	0.73	486	0.39	487	378.54	488	0.83
489	0.39	490	5.96	491	1434.50	492	21.60	493	1.14	494	21.58	495	163.64	496	5.41
497	2.31	498	21.58	499	0.41	500	2.31	501	0.39	502	0.98	503	1.41	504	1190.53
505	20.18	506	7.78	507	0.39	508	13.99	509	0.39	510	2986.06	511	4.04	512	1126.89

513	6.20	514	1725.46	515	2.06	516	163.33	517	3.56	518	2342.16	519	9.32	520	0.76
521	0.39	522	0.67	523	20.21	524	18.61	525	29.33	526	7.65	527	64.92	528	387.26
529	0.76	530	2662.74	531	90.52	532	1.14	533	0.41	534	20.18	535	791.44	536	1.72
537	1.14	538	471.78	539	0.83	540	0.77	541	0.95	542	1.15	543	0.42	544	1.26
545	0.40	546	1.14	547	0.39	548	98.70	549	494.39	550	4.20	551	30.51	552	0.38
553	1496.10	554	0.41	555	3543.72	556	0.39	557	1.78	558	0.81	559	2.29	560	0.87
561	5.58	562	0.40	563	1.35	564	0.80	565	0.76	566	18.59	567	0.41	568	1.17
569	0.39	570	4.68	571	1324.62	572	3.97	573	18.59	574	15.46	575	0.40	576	454.85
577	1.15	578	2.90	579	28.02	580	24.36	581	2647.88	582	0.84	583	0.39	584	0.41
585	182.44	586	189.29	587	2.66	588	39.39	589	0.84	590	0.65	591	153.15	592	0.42
593	0.41	594	2.90	595	3370.53	596	20.21	597	1.15	598	2.82	599	454.85	600	62.33
601	0.90	602	13.43	603	10.30	604	72.24	605	0.41	606	0.59	607	0.90	608	759.13
609	2082.87	610	0.39	611	0.98	612	1.41	613	1190.53	614	20.18	615	7.78	616	0.39
617	13.99	618	0.39	619	2986.06	620	4.04	621	1126.89	622	6.20	623	1725.46	624	2.06
625	163.33	626	3.56	627	2342.16	628	9.32	629	0.76	630	0.39	631	0.67	632	20.21
633	18.61	634	29.33	635	7.65	636	64.92	637	387.26	638	0.76	639	2662.74	640	90.52
641	1.14	642	0.41	643	20.18	644	791.44	645	1.72	646	1.14	647	471.78	648	0.83

649	0.77	650	0.95	651	1.15	652	0.42	653	1.26	654	0.40	655	1.14	656	0.39
657	98.70	658	494.39	659	4.20	660	30.51	661	0.38	662	1496.10	663	0.41	664	3543.72
665	0.39	666	1.78	667	0.81	668	2.29	669	0.87	670	5.58	671	0.40	672	1.35
673	0.80	674	0.76	675	18.59	676	0.41	677	1.17	678	0.39	679	4.68	680	1324.62
681	3.97	682	18.59	683	15.46	684	0.40	685	454.85	686	1.15	687	2.90	688	28.02
689	24.36	690	90.52	691	1.14	692	0.41	693	20.18	694	791.44	695	1.72	696	1.14
697	471.78	698	0.83	699	0.77	700	0.95	701	1.15	702	0.42	703	1.26	704	0.40
705	1.14	706	0.39	707	98.70	708	494.39	709	4.20	710	30.51	711	0.38	712	1496.10
713	0.41	714	3543.72	715	0.39	716	1.78	717	0.81	718	2.29	719	0.87	720	5.58
721	0.40	722	1.35	723	0.80	724	0.76	725	18.59	726	0.41	727	1.17	728	0.39
729	4.68	730	1324.62	731	3.97	732	18.59	733	15.46	734	0.40	735	454.85	736	1.15
737	2.90	738	28.02	739	24.36	740	90.52	741	1.14	742	0.41	743	20.18	744	791.44
745	1.72	746	1.14	747	471.78	748	0.83	749	0.77	750	0.95	751	1.15	752	0.42
753	1.26	754	0.40	755	1.14	756	0.39	757	98.70	758	494.39	759	4.20	760	30.51
761	0.38	762	1496.10	763	0.41	764	3543.72	765	0.39	766	1.78	767	0.81	768	2.29
769	0.87	770	5.58	771	0.40	772	1.35	773	0.80	774	0.76	775	18.59	776	0.41
777	1.17	778	0.39	779	4.68	780	1324.62	781	3.97	782	18.59	783	15.46	784	0.40

785	454.85	786	1.15	787	2.90	788	28.02	789	24.36	790	3.33	791	2650.45	792	1.90
793	0.69	794	0.29	795	0.76	796	1.38	797	2.49	798	2.13	799	1.31	800	1.25
801	2.14	802	1.31	803	1.31	804	75.08	805	237.54	806	16.75	807	228.05	808	1.90
809	0.69	810	0.29	811	0.76	812	1.38	813	2.49	814	2.13	815	1.31	816	1.25
817	1.90	818	0.69	819	0.29	820	0.76	821	1.38	822	2.49	823	2.13	824	1.31
825	5.32	826	215.23	827	115.67	828	3378.44	829	2.37	830	5.35	831	56.90	832	221.42
833	2903.45	834	838.84	835	2.32	836	499.79	837	43.23	838	245.09	839	0.81	840	14.19
841	243.13	842	0.59	843	0.98	844	1.23	845	8.66	846	237.65	847	643.39	848	1.31
849	1.31	850	75.08	851	237.54	852	16.75	853	228.05	854	1.90	855	0.69	856	0.29
857	0.76	858	1.38	859	2.49	860	2.13	861	1.31	862	1.25	863	1.90	864	0.69
865	0.29	866	0.76	867	1.38	868	2.49	869	2.13	870	1.31	871	5.32	872	215.23
873	115.67	874	3378.44	875	2.37	876	5.35	877	56.90	878	221.42	879	2903.45	880	838.84
881	2.32	882	499.79	883	43.23	884	245.09	885	0.81	886	14.19	887	243.13	888	0.59
889	0.98	890	1.23	891	8.66	892	22.74	893	215.23	894	115.67	895	3378.44	896	2.37
897	5.35	898	56.90	899	221.42	900	2903.45	901	838.84	902	2.32	903	499.79	904	43.23
905	245.09	906	0.81	907	14.19	908	243.13	909	0.59	910	0.98	911	1.23	912	8.66
913	237.65	914	643.39	915	1.31	916	1.31	917	75.08	918	237.54	919	16.75	920	228.05

921	1.90	922	0.69	923	0.29	924	0.76	925	1.38	926	2.49	927	2.13	928	1.31
929	1.25	930	1.90	931	0.69	932	0.29	933	0.76	934	1.38	935	2.49	936	2.13
937	1.31	938	5.32	939	215.23	940	115.67	941	3378.44	942	2.37	943	5.35	944	56.90
945	221.42	946	2903.45	947	838.84	948	2.32	949	499.79	950	43.23	951	245.09	952	0.81
953	14.19	954	243.13	955	0.59	956	0.98	957	1.23	958	8.66	959	22.74	960	0.81
961	7.79	962	153.15	963	0.41	964	0.92	965	5.33	966	2.67	967	0.41	968	0.42
969	0.98	970	0.41	971	0.40	972	1.73	973	1.52	974	1.14	975	21.04	976	20.18
977	1.15	978	1.15	979	7.79	980	0.41	981	0.62	982	0.41	983	0.41	984	1.15
985	0.42	986	7.78	987	0.41	988	1.70	989	0.83	990	0.81	991	8.03	992	0.38
993	0.62	994	1625.21	995	0.58	996	2.35	997	0.42	998	0.73	999	0.94	1000	18.61
1001	0.77	1002	7.88	1003	40.04	1004	0.39	1005	3.33	1006	2.90	1007	41.95	1008	0.41
1009	1.38	1010	7.78	1011	40.04	1012	0.81	1013	7.79	1014	153.15	1015	0.41	1016	0.92
1017	5.33	1018	2.67	1019	0.41	1020	0.42	1021	0.98	1022	0.41	1023	0.40	1024	1.73
1025	1.52	1026	1.14	1027	21.04	1028	20.18	1029	1.15	1030	1.15	1031	7.79	1032	0.41
1033	0.62	1034	0.41	1035	0.41	1036	1.15	1037	0.42	1038	7.78	1039	0.41	1040	1.70
1041	0.83	1042	0.81	1043	8.03	1044	0.38	1045	0.62	1046	1625.21	1047	0.58	1048	2.35
1049	0.42	1050	0.73	1051	1.01	1052	18.61	1053	0.77	1054	43.80	1055	40.04	1056	7.78

1057	2145.45	1058	2.90	1059	41.95	1060	0.41	1061	1.38	1062	7.78	1063	40.04	1064	18.59
1065	0.77	1066	1.44	1067	1.14	1068	6090.70	1069	0.40	1070	1500.38	1071	0.85	1072	0.39
1073	1.15	1074	0.40	1075	18.59	1076	424.05	1077	18.59	1078	20.18	1079	1.14	1080	8.66
1081	20.18	1082	7.79	1083	0.39	1084	1.15	1085	1.72	1086	184.79	1087	2.80	1088	0.40
1089	1.16	1090	1190.53	1091	20.18	1092	7.78	1093	0.39	1094	13.99	1095	0.39	1096	0.98
1097	18.59	1098	0.77	1099	1.44	1100	1.14	1101	0.56	1102	0.40	1103	0.91	1104	0.85
1105	0.39	1106	1.15	1107	0.40	1108	18.59	1109	424.05	1110	18.59	1111	20.18	1112	1.14
1113	8.66	1114	36.78	1115	7.79	1116	0.40	1117	1.15	1118	1.72	1119	184.79	1120	2.80

Appendix IV

WASSCE 2014 TEST INFORMATION FUNCTION

ID	Info	ID	Info	ID	Info	ID	Info	ID	Info	ID	Info	ID	Info	ID	Info
1	397.54	2	47.70	3	64.35	4	32.95	5	0.59	6	53.10	7	39.35	8	13.40
9	0.84	10	0.58	11	0.97	12	0.66	13	2.14	14	0.95	15	0.83	16	14.28
17	0.96	18	1.02	19	5.38	20	1.02	21	17.14	22	8.93	23	0.57	24	31.12
25	9.35	26	8.29	27	1,076.18	28	5.00	29	2.19	30	22.28	31	64.02	32	60.19
33	31.08	34	4.59	35	1.32	36	0.82	37	0.85	38	0.50	39	4.15	40	1.58
41	3.27	42	6.63	43	0.82	44	1.18	45	0.48	46	3.82	47	4.27	48	2.01
49	655.94	50	1.49	51	8.60	52	2.25	53	304.92	54	0.83	55	1.43	56	7.66
57	7.51	58	5.43	59	7.61	60	6.13	61	0.94	62	2.33	63	112.61	64	1.50
65	0.59	66	0.37	67	0.72	68	2.49	69	1.79	70	3.05	71	0.37	72	0.44
73	42.04	74	0.79	75	144.60	76	0.60	77	5.37	78	0.80	79	0.21	80	0.59
81	0.59	82	1.21	83	2.86	84	0.31	85	0.96	86	14.95	87	2.61	88	36.30
89	0.59	90	3.03	91	2.03	92	0.58	93	5.26	94	0.60	95	0.58	96	2.58
97	8.00	98	850.78	99	1.90	100	417.08	101	0.78	102	408.01	103	1.66	104	1.17

105	47.70	106	0.47	107	3.73	108	85.09	109	47.70	110	27.62	111	0.46	112	1.05
113	0.94	114	1.26	115	21.12	116	1.05	117	1.13	118	289.93	119	0.51	120	15.54
121	28.48	122	3.88	123	31.82	124	16.86	125	31.90	126	11.60	127	0.82	128	0.87
129	211.91	130	1.38	131	15.71	132	0.86	133	0.82	134	0.63	135	11.83	136	0.83
137	2.00	138	0.94	139	9.94	140	29.82	141	5.56	142	7.66	143	14.37	144	37.85
145	0.31	146	17.28	147	4.93	148	8.36	149	0.94	150	0.84	151	29.20	152	0.04
153	1.00	154	21.91	155	54.74	156	79.25	157	18.06	158	98.67	159	1.09	160	3.00
161	13.11	162	8.52	163	14.27	164	10.45	165	1.35	166	8.00	167	6.23	168	663.92
169	1.60	170	0.48	171	1.30	172	5.81	173	35.85	174	9.68	175	0.85	176	0.45
177	227.93	178	4.75	179	81.67	180	106.35	181	1.06	182	9.20	183	14.35	184	9.29
185	3.21	186	0.96	187	30.08	188	27.28	189	35.58	190	29.26	191	33.72	192	32.60
193	35.59	194	4.21	195	619.05	196	611.27	197	42.00	198	618.98	199	11.56	200	697.45
201	35.76	202	611.57	203	611.38	204	54.96	205	618.41	206	350.92	207	651.42	208	722.30
209	74.85	210	613.60	211	12.82	212	625.38	213	11.75	214	36.27	215	54.96	216	562.70
217	618.41	218	105.68	219	611.13	220	35.15	221	64.26	222	554.69	223	618.41	224	54.96
225	91.52	226	54.96	227	619.05	228	33.74	229	618.61	230	23.35	231	10.92	232	10.43

233	89.33	234	0.46	235	3.58	236	47.70	237	29.88	238	90.74	239	0.18	240	6.72
241	0.71	242	8.64	243	9.56	244	26.95	245	0.13	246	1.10	247	0.98	248	215.38
249	1.44	250	5.21	251	7.29	252	0.97	253	2.92	254	0.86	255	18.04	256	1.30
257	10.13	258	5.09	259	25.71	260	0.94	261	3.05	262	19.89	263	1.22	264	7.57
265	0.94	266	0.51	267	7.42	268	2.04	269	8.70	270	0.17	271	1.73	272	0.94
273	1.00	274	9.17	275	4.81	276	1.71	277	15.13	278	13.72	279	18.74	280	1.11
281	26.71	282	29.72	283	2.11	284	295.51	285	110.31	286	20.57	287	0.94	288	28.57
289	6.37	290	1.42	291	0.95	292	0.94	293	1.07	294	5.35	295	0.48	296	1.29
297	0.46	298	2.51	299	0.44	300	5.13	301	3.37	302	19.15	303	13.32	304	1.64
305	1.97	306	32.26	307	12.98	308	228.77	309	0.83	310	0.75	311	233.51	312	1.40
313	9.50	314	7.35	315	367.18	316	13.85	317	6.09	318	8.97	319	1.40	320	0.86
321	16.27	322	9.72	323	668.62	324	48.80	325	42.37	326	42.49	327	13.43	328	19.10
329	7.82	330	0.83	331	0.82	332	2.47	333	0.93	334	0.92	335	145.60	336	5.03
337	5.42	338	20.60	339	2.66	340	6.79	341	1.39	342	5.58	343	0.90	344	5.01
345	1.05	346	17.24	347	7.30	348	0.54	349	1.18	350	2.22	351	18.57	352	7.19
353	3.93	354	1.44	355	397.54	356	0.59	357	203.15	358	89.45	359	0.59	360	0.59

361	39.35	362	20.29	363	0.84	364	0.58	365	0.97	366	0.66	367	1.86	368	0.97
369	0.83	370	19.39	371	0.96	372	1.25	373	5.38	374	1.02	375	18.49	376	8.93
377	0.57	378	31.09	379	9.35	380	7.64	381	1,076.18	382	5.00	383	2.19	384	22.28
385	64.02	386	60.19	387	31.08	388	4.59	389	1.32	390	0.82	391	0.85	392	0.50
393	4.15	394	1.58	395	3.27	396	6.63	397	0.82	398	1.18	399	0.48	400	4.42
401	4.27	402	2.01	403	655.94	404	1.49	405	2.68	406	2.25	407	306.20	408	0.85
409	1.47	410	32.74	411	64.76	412	5.43	413	7.61	414	6.70	415	0.94	416	2.35
417	112.61	418	1.50	419	0.59	420	0.37	421	0.72	422	2.49	423	1.79	424	3.05
425	0.37	426	0.44	427	42.04	428	0.79	429	144.60	430	0.60	431	5.37	432	0.80
433	0.21	434	0.59	435	0.59	436	1.21	437	2.86	438	0.31	439	0.96	440	14.95
441	2.61	442	36.30	443	0.59	444	3.03	445	2.03	446	0.58	447	5.26	448	0.60
449	0.58	450	2.58	451	8.00	452	850.78	453	1.90	454	417.08	455	0.78	456	408.01
457	1.66	458	1.17	459	47.70	460	0.47	461	3.73	462	85.09	463	47.70	464	27.62
465	0.46	466	1.05	467	0.94	468	1.26	469	21.12	470	1.05	471	1.13	472	289.93
473	0.51	474	15.54	475	28.48	476	3.88	477	31.82	478	16.86	479	31.90	480	11.60
481	0.82	482	0.87	483	211.91	484	1.38	485	15.71	486	0.86	487	0.82	488	0.63

489	11.83	490	0.83	491	2.00	492	0.94	493	9.94	494	29.82	495	5.56	496	7.66
497	93.57	498	37.85	499	0.31	500	17.28	501	4.93	502	8.89	503	0.94	504	0.84
505	27.18	506	1.16	507	47.70	508	1.16	509	32.95	510	0.59	511	53.10	512	39.35
513	13.40	514	5.50	515	0.58	516	10.80	517	5.09	518	4.94	519	0.95	520	0.83
521	24.14	522	1.17	523	3.91	524	46.53	525	1.03	526	40.00	527	8.93	528	0.57
529	31.12	530	9.35	531	8.29	532	1,076.18	533	5.02	534	2.19	535	22.28	536	64.02
537	60.19	538	34.81	539	4.59	540	1.32	541	0.82	542	0.85	543	0.51	544	4.15
545	1.58	546	3.27	547	6.63	548	0.82	549	1.18	550	0.48	551	3.82	552	4.27
553	2.01	554	655.94	555	1.49	556	8.60	557	2.25	558	304.92	559	0.83	560	1.43
561	7.66	562	7.51	563	5.43	564	7.61	565	6.13	566	0.94	567	2.33	568	112.61
569	1.50	570	0.59	571	0.37	572	0.72	573	2.49	574	1.79	575	3.05	576	0.37
577	0.44	578	42.04	579	0.79	580	144.60	581	0.60	582	5.37	583	0.80	584	0.21
585	0.59	586	0.59	587	1.21	588	2.86	589	0.31	590	0.96	591	14.95	592	2.61
593	36.30	594	0.59	595	3.03	596	2.03	597	0.58	598	5.26	599	0.60	600	0.58
601	2.58	602	8.00	603	850.78	604	1.90	605	417.08	606	0.78	607	408.01	608	1.66
609	1.51	610	0.59	611	0.47	612	488.73	613	85.09	614	0.59	615	27.62	616	0.46

617	1.05	618	0.95	619	1.26	620	21.12	621	1.05	622	1.13	623	289.93	624	0.51
625	15.54	626	28.48	627	3.88	628	31.82	629	17.86	630	31.90	631	11.60	632	0.82
633	0.87	634	185.01	635	1.38	636	15.71	637	0.86	638	0.82	639	0.63	640	11.83
641	0.83	642	2.00	643	0.94	644	9.94	645	29.82	646	5.56	647	7.66	648	14.37
649	37.85	650	0.31	651	17.28	652	4.93	653	8.89	654	0.95	655	0.84	656	29.20
657	0.04	658	1.00	659	31.76	660	74.13	661	76.57	662	18.06	663	98.67	664	1.09
665	3.00	666	16.17	667	4.76	668	12.52	669	10.45	670	1.35	671	8.00	672	6.23
673	663.92	674	1.60	675	0.48	676	1.44	677	5.88	678	35.85	679	97.25	680	0.85
681	0.45	682	227.93	683	4.75	684	156.54	685	106.35	686	1.06	687	9.20	688	14.35
689	8.88	690	3.21	691	0.97	692	30.08	693	33.67	694	35.56	695	118.16	696	33.71
697	32.60	698	35.48	699	4.21	700	618.13	701	611.27	702	42.00	703	618.98	704	11.56
705	697.45	706	35.76	707	611.57	708	611.38	709	54.96	710	618.41	711	350.92	712	651.42
713	722.30	714	74.85	715	613.60	716	12.82	717	625.38	718	11.75	719	36.27	720	54.96
721	562.70	722	618.41	723	105.68	724	611.13	725	35.15	726	64.26	727	554.69	728	618.41
729	54.96	730	91.52	731	54.96	732	619.05	733	33.74	734	618.61	735	23.35	736	10.92
737	10.43	738	89.33	739	0.46	740	3.58	741	47.70	742	29.88	743	90.74	744	0.18

745	6.72	746	0.71	747	8.64	748	9.56	749	26.95	750	0.13	751	1.10	752	0.98
753	1.24	754	1.44	755	5.21	756	7.29	757	0.97	758	2.92	759	0.86	760	18.04
761	1.30	762	10.13	763	5.09	764	25.71	765	0.94	766	3.05	767	19.89	768	1.22
769	7.57	770	0.94	771	0.51	772	7.42	773	2.04	774	8.70	775	0.17	776	1.73
777	0.94	778	1.00	779	9.17	780	4.81	781	1.71	782	15.13	783	13.72	784	18.74
785	1.11	786	26.71	787	29.72	788	2.11	789	295.51	790	110.31	791	20.57	792	0.94
793	28.57	794	6.37	795	1.42	796	0.95	797	0.94	798	1.07	799	5.35	800	0.48
801	1.29	802	0.46	803	2.51	804	0.44	805	0.83	806	3.37	807	19.15	808	13.32
809	1.64	810	1.97	811	32.26	812	12.98	813	228.77	814	0.83	815	0.75	816	233.51
817	1.40	818	9.50	819	7.35	820	367.18	821	13.85	822	6.09	823	8.97	824	1.40
825	0.86	826	16.27	827	9.72	828	668.62	829	48.80	830	42.37	831	60.35	832	13.43
833	19.10	834	7.82	835	0.83	836	0.82	837	2.47	838	0.93	839	0.92	840	674.90
841	10.96	842	5.42	843	20.76	844	2.66	845	6.80	846	1.47	847	2.75	848	1.01
849	492.45	850	1.09	851	18.83	852	9.18	853	0.57	854	1.20	855	4.13	856	14.91
857	6.86	858	10.05	859	1.44	860	397.54	861	1.00	862	21.91	863	54.74	864	79.29
865	18.06	866	98.67	867	1.09	868	3.00	869	13.11	870	8.52	871	14.27	872	10.45

873	1.35	874	8.00	875	6.23	876	663.92	877	1.60	878	0.51	879	1.30	880	5.81
881	35.85	882	9.68	883	0.85	884	0.45	885	271.96	886	4.75	887	81.67	888	106.35
889	1.06	890	9.20	891	14.35	892	9.29	893	3.21	894	0.96	895	30.08	896	27.28
897	35.58	898	29.26	899	33.72	900	397.54	901	47.70	902	64.35	903	32.95	904	0.59
905	53.10	906	39.35	907	13.40	908	0.84	909	0.58	910	0.97	911	0.66	912	2.14
913	0.95	914	0.83	915	19.39	916	0.96	917	1.02	918	3.49	919	1.03	920	17.14
921	8.99	922	0.57	923	22.27	924	9.35	925	8.29	926	1,234.45	927	5.00	928	2.19
929	22.28	930	61.18	931	60.19	932	34.86	933	4.59	934	1.32	935	0.83	936	0.86
937	0.51	938	4.15	939	1.64	940	3.27	941	3.30	942	0.82	943	1.21	944	0.48
945	3.82	946	5.88	947	35.85	948	97.25	949	0.85	950	0.45	951	227.93	952	4.75
953	156.54	954	106.35	955	1.06	956	9.20	957	14.35	958	8.88	959	3.21	960	0.97
961	30.08	962	33.67	963	35.56	964	118.16	965	33.71	966	32.60	967	35.48	968	4.21
969	618.13	970	611.27	971	42.00	972	618.98	973	11.56	974	697.45	975	35.76	976	611.57
977	611.38	978	54.96	979	618.41	980	350.92	981	651.42	982	722.30	983	74.85	984	613.60
985	12.82	986	625.38	987	11.75	988	36.27	989	42.85	990	560.76	991	706.14	992	32.42
993	611.13	994	35.14	995	64.26	996	554.69	997	618.13	998	42.85	999	32.42	1000	42.84

1001	619.05	1002	33.72	1003	618.33	1004	24.26	1005	10.72	1006	32.63	1007	301.85	1008	0.46
1009	11.75	1010	36.27	1011	54.96	1012	562.70	1013	618.41	1014	105.68	1015	611.13	1016	35.15
1017	64.26	1018	554.69	1019	618.41	1020	54.96	1021	91.52	1022	54.96	1023	619.05	1024	33.74
1025	618.61	1026	23.35	1027	10.92	1028	10.43	1029	89.33	1030	0.46	1031	3.58	1032	47.70
1033	29.88	1034	90.74	1035	0.18	1036	6.72	1037	0.71	1038	8.64	1039	9.56	1040	26.95
1041	0.13	1042	1.10	1043	0.98	1044	215.38	1045	11.75	1046	36.27	1047	54.96	1048	562.70
1049	618.41	1050	105.68	1051	611.13	1052	35.15	1053	64.26	1054	554.69	1055	618.41	1056	54.96
1057	91.52	1058	42.85	1059	618.13	1060	33.72	1061	618.61	1062	23.35	1063	10.72	1064	13.82
1065	63.39	1066	0.46	1067	3.58	1068	47.70	1069	22.24	1070	283.59	1071	0.18	1072	6.80
1073	0.72	1074	8.64	1075	10.81	1076	26.95	1077	0.25	1078	1.10	1079	0.98	1080	215.38
1081	11.75	1082	36.27	1083	54.96	1084	562.70	1085	618.41	1086	105.68	1087	611.13	1088	35.15
1089	64.26	1090	554.69	1091	618.41	1092	54.96	1093	32.42	1094	42.85	1095	34.24	1096	33.74
1097	705.08	1098	23.35	1099	45.44	1100	10.43	1101	247.05	1102	0.46	1103	3.58	1104	0.59
1105	26.64	1106	93.94	1107	0.18	1108	6.89	1109	0.71	1110	8.70	1111	9.56	1112	26.95
1113	0.13	1114	1.10	1115	1.02	1116	215.38	1117	705.08	1118	23.35	1119	45.44	1120	10.43

Appendix V

Relative Efficiency of 2013 and 2014

ID	RE	ID	RE	ID	RE	ID	RE	ID	RE	ID	RE	ID	RE	ID	RE
1	490.8	2	6.1	3	0.4	4	38.1	5	0.6	6	10.0	7	14.7	8	32.6
9	2.0	10	0.6	11	2.4	12	1.7	13	1.2	14	0.6	15	0.7	16	0.7
17	0.0	18	0.9	19	4.7	20	0.1	21	41.7	22	14.3	23	1.4	24	75.6
25	8.1	26	19.9	27	138.3	28	12.2	29	1.3	30	26.9	31	79.3	32	7.5
33	81.2	34	7.4	35	0.0	36	1.4	37	0.4	38	1.2	39	5.7	40	0.0
41	0.2	42	8.7	43	0.0	44	0.0	45	0.1	46	0.0	47	1.5	48	0.0
49	1597.6	50	1.1	51	1.1	52	0.1	53	0.4	54	2.1	55	0.0	56	1.0
57	9.8	58	0.0	59	19.2	60	5.4	61	2.3	62	0.3	63	6.1	64	2.0
65	0.4	66	0.3	67	1.3	68	6.3	69	2.0	70	3.6	71	0.9	72	0.4
73	105.1	74	0.0	75	0.3	76	0.0	77	0.3	78	0.7	79	0.0	80	0.0
81	0.1	82	3.1	83	2.5	84	0.2	85	0.0	86	5.3	87	6.5	88	31.4
89	0.0	90	0.2	91	0.3	92	1.5	93	0.4	94	1.5	95	0.6	96	1.8
97	0.0	98	559.2	99	4.6	100	512.2	101	0.7	102	52.4	103	2.1	104	0.1
105	0.3	106	1.1	107	4.1	108	16.0	109	17.9	110	67.2	111	1.1	112	1.1
113	2.3	114	3.2	115	12.2	116	0.7	117	1.0	118	13.8	119	0.0	120	13.5
121	24.8	122	0.5	123	77.5	124	27.0	125	77.5	126	28.2	127	0.7	128	2.1
129	27.2	130	3.4	131	9.3	132	1.0	133	1.0	134	0.8	135	1.5	136	0.0
137	4.8	138	1.0	139	1.9	140	11.2	141	13.5	142	18.3	143	14.7	144	92.2
145	0.8	146	10.0	147	3.2	148	7.3	149	0.0	150	0.0	151	25.5	152	0.0
153	0.1	154	53.4	155	87.7	156	192.5	157	43.9	158	86.0	159	2.6	160	0.4
161	31.9	162	5.0	163	17.2	164	12.9	165	1.7	166	1.0	167	0.0	168	1612.1
169	1.7	170	0.1	171	0.5	172	14.1	173	85.5	174	9.9	175	2.1	176	1.1
177	131.7	178	3.1	179	71.4	180	5.1	181	0.1	182	8.0	183	12.5	184	1.2
185	7.8	186	1.5	187	73.1	188	66.3	189	31.0	190	70.4	191	4.3	192	79.4
193	21.0	194	5.1	195	766.4	196	756.7	197	5.2	198	1617.0	199	18.6	200	0.4

201	61.6	202	260.0	203	1463.2	204	75.0	205	12.8	206	18.9	207	850.2	208	16.5
209	1.9	210	78.9	211	0.0	212	216.0	213	0.3	214	88.3	215	39.8	216	72.3
217	15.4	218	0.1	219	1554.6	220	0.9	221	8.3	222	723.9	223	1.3	224	138.3
225	80.6	226	68.0	227	77.1	228	88.1	229	993.3	230	0.0	231	18.8	232	4.4
233	213.8	234	0.6	235	0.1	236	2.6	237	39.0	238	2.1	239	0.0	240	0.9
241	0.0	242	3.0	243	0.2	244	65.6	245	0.1	246	0.1	247	0.0	248	0.3
249	3.7	250	0.1	251	0.9	252	1.3	253	0.0	254	2.2	255	15.9	256	1.6
257	1.3	258	13.3	259	41.3	260	0.0	261	5.3	262	8.5	263	2.9	264	10.3
265	0.0	266	0.0	267	9.7	268	0.0	269	0.2	270	0.0	271	0.0	272	0.3
273	0.0	274	22.3	275	3.5	276	0.2	277	0.4	278	0.0	279	47.7	280	0.0
281	3.4	282	38.8	283	0.0	284	743.4	285	97.1	286	8.5	287	2.3	288	10.2
289	15.9	290	1.2	291	0.0	292	0.0	293	0.1	294	13.6	295	0.0	296	3.3
297	0.5	298	1.8	299	1.1	300	0.4	301	8.6	302	19.5	303	9.5	304	0.0
305	0.1	306	4.1	307	33.1	308	16.3	309	2.1	310	0.0	311	57.7	312	0.0
313	1.5	314	0.0	315	178.4	316	0.1	317	1.7	318	0.0	319	0.1	320	1.1
321	41.5	322	14.6	323	33.1	324	2.6	325	1.4	326	5.6	327	0.2	328	0.0
329	10.2	330	0.0	331	0.0	332	2.2	333	2.3	334	0.0	335	0.2	336	2.9
337	4.7	338	0.0	339	3.2	340	8.9	341	1.5	342	4.9	343	2.1	344	4.0
345	2.6	346	15.1	347	18.6	348	0.0	349	0.0	350	0.5	351	9.5	352	11.7
353	0.2	354	0.2	355	54.5	356	0.0	357	35.4	358	3.6	359	0.0	360	0.1
361	25.0	362	0.3	363	0.1	364	0.2	365	0.0	366	0.0	367	0.7	368	0.0
369	0.0	370	36.5	371	0.6	372	0.0	373	0.3	374	0.1	375	0.0	376	7.9
377	0.4	378	30.8	379	9.1	380	3.7	381	1461.9	382	4.0	383	3.0	384	56.8
385	0.2	386	72.3	387	79.2	388	0.8	389	0.0	390	0.0	391	0.7	392	0.0
393	0.0	394	0.3	395	1.4	396	0.3	397	2.0	398	0.0	399	0.2	400	0.2
401	3.0	402	0.0	403	32.5	404	0.2	405	6.8	406	0.2	407	780.2	408	0.0
409	0.4	410	0.0	411	10.4	412	0.0	413	3.7	414	0.0	415	0.3	416	0.0
417	12.1	418	2.0	419	1.5	420	0.6	421	0.0	422	0.1	423	0.1	424	0.4
425	0.0	426	0.0	427	55.1	428	0.0	429	1.6	430	0.5	431	13.1	432	0.0
433	0.0	434	0.0	435	0.0	436	0.7	437	2.5	438	0.0	439	1.1	440	19.5

441	2.8	442	31.6	443	1.4	444	2.4	445	5.1	446	0.5	447	13.4	448	0.0
449	0.0	450	0.6	451	4.1	452	1384.4	453	0.1	454	55.8	455	0.1	456	16.4
457	0.3	458	0.0	459	3.1	460	0.1	461	2.4	462	1.2	463	2.9	464	9.2
465	0.0	466	0.0	467	0.3	468	0.0	469	0.6	470	2.0	471	0.7	472	545.4
473	0.3	474	0.1	475	1.4	476	0.5	477	0.0	478	14.9	479	23.1	480	11.5
481	0.8	482	0.4	483	287.9	484	1.1	485	21.4	486	2.2	487	0.0	488	0.8
489	30.1	490	0.1	491	0.0	492	0.0	493	8.7	494	1.4	495	0.0	496	1.4
497	40.5	498	1.8	499	0.8	500	7.5	501	12.6	502	9.0	503	0.7	504	0.0
505	1.3	506	0.1	507	121.5	508	0.1	509	83.9	510	0.0	511	13.1	512	0.0
513	2.2	514	0.0	515	0.3	516	0.1	517	1.4	518	0.0	519	0.1	520	1.1
521	61.5	522	1.8	523	0.2	524	2.5	525	0.0	526	5.2	527	0.1	528	0.0
529	40.8	530	0.0	531	0.1	532	940.7	533	12.2	534	0.1	535	0.0	536	37.2
537	52.6	538	0.1	539	5.5	540	1.7	541	0.9	542	0.7	543	1.2	544	3.3
545	3.9	546	2.9	547	16.9	548	0.0	549	0.0	550	0.1	551	0.1	552	11.2
553	0.0	554	1592.7	555	0.0	556	21.9	557	1.3	558	378.1	559	0.4	560	1.6
561	1.4	562	18.7	563	4.0	564	9.5	565	8.0	566	0.1	567	5.7	568	96.3
569	3.8	570	0.1	571	0.0	572	0.2	573	0.1	574	0.1	575	7.7	576	0.0
577	0.4	578	14.5	579	0.0	580	5.9	581	0.0	582	6.4	583	2.0	584	0.5
585	0.0	586	0.0	587	0.5	588	0.1	589	0.4	590	1.5	591	0.1	592	6.3
593	88.0	594	0.2	595	0.0	596	0.1	597	0.5	598	1.9	599	0.0	600	0.0
601	2.9	602	0.6	603	82.6	604	0.0	605	1012.8	606	1.3	607	453.4	608	0.0
609	0.0	610	1.5	611	0.5	612	347.0	613	0.1	614	0.0	615	3.5	616	1.2
617	0.1	618	2.4	619	0.0	620	5.2	621	0.0	622	0.2	623	0.2	624	0.2
625	0.1	626	8.0	627	0.0	628	3.4	629	23.4	630	81.3	631	17.4	632	0.0
633	0.0	634	6.3	635	0.2	636	0.2	637	0.0	638	1.1	639	0.0	640	0.1
641	0.7	642	4.9	643	0.0	644	0.0	645	17.3	646	4.9	647	0.0	648	17.3
649	49.4	650	0.3	651	15.1	652	11.7	653	7.1	654	2.4	655	0.7	656	74.3
657	0.0	658	0.0	659	7.6	660	2.4	661	200.0	662	0.0	663	239.6	664	0.0
665	7.6	666	9.1	667	5.9	668	5.5	669	12.1	670	0.2	671	19.9	672	4.6
673	828.7	674	2.1	675	0.0	676	3.5	677	5.0	678	91.2	679	20.8	680	0.0

681	0.1	682	12.3	683	0.3	684	394.8	685	0.2	686	0.9	687	3.2	688	0.5
689	0.4	690	0.0	691	0.8	692	73.2	693	1.7	694	0.0	695	68.7	696	29.5
697	0.1	698	42.6	699	5.5	700	651.5	701	532.9	702	99.3	703	490.9	704	28.7
705	609.6	706	91.0	707	6.2	708	1.2	709	13.1	710	20.3	711	916.7	712	0.4
713	1753.8	714	0.0	715	1561.4	716	7.2	717	775.5	718	5.1	719	41.9	720	9.9
721	1399.2	722	459.4	723	131.9	724	800.9	725	1.9	726	156.5	727	474.5	728	1573.2
729	11.7	730	0.1	731	13.9	732	33.3	733	2.2	734	1560.0	735	0.1	736	9.5
737	3.6	738	3.2	739	0.0	740	0.0	741	41.7	742	72.8	743	4.5	744	0.0
745	3.9	746	0.6	747	0.0	748	11.5	749	35.2	750	0.1	751	1.0	752	2.3
753	1.0	754	3.6	755	4.6	756	18.5	757	0.0	758	0.0	759	0.2	760	0.6
761	3.4	762	0.0	763	12.4	764	0.0	765	2.4	766	1.7	767	24.7	768	0.5
769	8.7	770	0.2	771	1.3	772	5.5	773	2.5	774	11.4	775	0.0	776	4.2
777	0.8	778	2.5	779	2.0	780	0.0	781	0.4	782	0.8	783	0.9	784	47.3
785	0.0	786	23.3	787	10.2	788	0.1	789	12.1	790	33.1	791	0.0	792	0.5
793	41.3	794	21.8	795	1.9	796	0.7	797	0.4	798	0.5	799	4.1	800	0.4
801	0.6	802	0.4	803	1.9	804	0.0	805	0.0	806	0.2	807	0.1	808	7.0
809	2.4	810	6.7	811	42.6	812	9.4	813	91.9	814	0.4	815	0.6	816	186.2
817	0.7	818	13.7	819	25.1	820	484.9	821	10.0	822	2.4	823	4.2	824	1.1
825	0.2	826	0.1	827	0.1	828	0.2	829	20.6	830	7.9	831	1.1	832	0.1
833	0.0	834	0.0	835	0.4	836	0.0	837	0.1	838	0.0	839	1.1	840	47.6
841	0.0	842	9.2	843	21.1	844	2.2	845	0.8	846	0.0	847	0.0	848	0.8
849	376.0	850	0.0	851	0.1	852	0.5	853	0.0	854	0.6	855	6.0	856	50.9
857	9.1	858	7.3	859	0.6	860	186.3	861	0.8	862	17.5	863	28.8	864	114.7
865	61.7	866	130.3	867	0.8	868	1.2	869	6.1	870	6.5	871	2.7	872	0.0
873	0.0	874	0.0	875	2.6	876	124.0	877	0.0	878	0.0	879	0.0	880	0.0
881	15.5	882	0.0	883	0.0	884	0.0	885	336.7	886	0.3	887	0.3	888	180.3
889	1.1	890	7.5	891	1.7	892	0.4	893	0.0	894	0.0	895	0.0	896	11.5
897	6.6	898	0.5	899	0.2	900	0.1	901	0.1	902	27.8	903	0.1	904	0.0
905	0.2	906	48.7	907	0.9	908	0.0	909	1.0	910	1.0	911	0.5	912	0.2
913	0.0	914	0.0	915	14.8	916	0.7	917	0.0	918	0.0	919	0.1	920	0.1

921	4.7	922	0.8	923	76.0	924	12.3	925	6.0	926	496.0	927	2.3	928	1.7
929	17.8	930	32.1	931	87.1	932	119.0	933	6.1	934	1.0	935	0.3	936	0.4
937	0.4	938	0.8	939	0.0	940	0.0	941	0.0	942	0.3	943	0.2	944	0.0
945	0.0	946	0.0	947	0.0	948	42.0	949	0.0	950	0.0	951	0.9	952	5.9
953	11.0	954	0.4	955	1.8	956	9.3	957	11.7	958	1.0	959	0.1	960	1.2
961	3.9	962	0.2	963	86.3	964	128.4	965	6.3	966	12.2	967	86.4	968	10.0
969	632.3	970	1488.4	971	105.9	972	357.7	973	7.6	974	609.7	975	1.7	976	30.3
977	533.0	978	47.9	979	79.4	980	854.7	981	1043.2	982	1754.5	983	181.8	984	534.9
985	30.8	986	80.4	987	28.6	988	21.4	989	51.7	990	694.2	991	88.0	992	84.7
993	981.3	994	0.0	995	110.7	996	235.8	997	1479.3	998	58.5	999	34.4	1000	2.3
1001	807.9	1002	4.3	1003	15.4	1004	61.8	1005	3.2	1006	11.3	1007	7.2	1008	1.1
1009	8.5	1010	4.7	1011	1.4	1012	695.2	1013	79.4	1014	0.7	1015	1483.9	1016	38.2
1017	12.1	1018	207.7	1019	1505.8	1020	131.0	1021	93.6	1022	133.8	1023	1560.7	1024	19.5
1025	406.5	-1026	20.4	1027	0.5	1028	0.5	1029	77.9	1030	0.4	1031	0.5	1032	116.2
1033	47.9	1034	220.4	1035	0.4	1036	5.9	1037	1.7	1038	1.1	1039	23.3	1040	15.9
1041	0.2	1042	1.4	1043	0.1	1044	562.7	1045	18.9	1046	0.0	1047	94.7	1048	239.2
1049	1480.0	1050	144.3	1051	606.4	1052	1.9	1053	83.9	1054	12.7	1055	15.4	1056	7.1
1057	0.0	1058	14.8	1059	14.7	1060	82.1	1061	448.4	1062	3.0	1063	0.3	1064	0.7
1065	82.7	1066	0.3	1067	3.1	1068	0.0	1069	56.0	1070	0.2	1071	0.2	1072	17.3
1073	0.6	1074	21.6	1075	0.6	1076	0.1	1077	0.0	1078	0.1	1079	0.9	1080	24.9
1081	0.6	1082	4.7	1083	139.8	1084	490.4	1085	360.3	1086	0.6	1087	218.0	1088	87.4
1089	55.5	1090	0.5	1091	30.6	1092	7.1	1093	82.6	1094	3.1	1095	87.3	1096	34.3
1097	37.9	1098	30.5	1099	31.5	1100	9.2	1101	443.7	1102	1.2	1103	3.9	1104	0.7
1105	67.9	1106	81.6	1107	0.5	1108	0.4	1109	0.0	1110	0.5	1111	0.5	1112	23.6
1113	0.0	1114	0.0	1115	0.1	1116	541.8	1117	614.5	1118	13.6	1119	0.2	1120	3.7

