Министерство науки и высшего образования Российской Федерации
Федеральное государственное бюджетное образовательное учреждение высшего образования «Ростовский государственный экономический университет (РИНХ)»

УТВЕРЖДАЮ
Директор Института магистратуры
_____ Иванова Е.А.
«29» 08 2022 г.

Рабочая программа дисциплины
Econometrics (advanced level) (Эконометрика (продвинутый уровень)

Направление 38.04.01 Экономика
магистерская программа 38.04.01.02 "International Business"

Для набора 2022 года

Квалификация
магистр

КАФЕДРА **Статистики, эконометрики и оценки рисков**

Распределение часов дисциплины по семестрам

Семестр (<Курс>.<Семестр на курсе>)	2 (1.2)		Итого	
Недель	15 2/6			
Вид занятий	УП	РП	УП	РП
Лабораторные	16	16	16	16
Практические	16	16	16	16
Итого ауд.	32	32	32	32
Контактная работа	32	32	32	32
Сам. работа	40	40	40	40
Итого	72	72	72	72

ОСНОВАНИЕ

Учебный план утвержден учёным советом вуза от 22.02.2022 протокол № 7.

Программу составил(и): к.э.н., доцент, Кокина Е.П. _____

Зав. кафедрой: д.э.н., профессор Ниворожкина Л.И. _____

Методическим советом направления: к.э.н., доцент, Бодягин О.В. _____

1. ЦЕЛИ ОСВОЕНИЯ ДИСЦИПЛИНЫ	
1.1	Цели дисциплины:
1.2	углубить представление обучаемых о теоретических основах современных эконометрических методов анализа данных; научить корректному использованию инструментов на практике при работе со специализированными эконометрическими программами.

2. ТРЕБОВАНИЯ К РЕЗУЛЬТАТАМ ОСВОЕНИЯ ДИСЦИПЛИНЫ
ОПК-2:Способен применять продвинутые инструментальные методы экономического анализа в прикладных и (или) фундаментальных исследованиях;
ОПК-5:Способен использовать современные информационные технологии и программные средства при решении профессиональных задач.

В результате освоения дисциплины обучающийся должен:
Знать:
методы сбора, анализа и обработки данных, эконометрического моделирования и прогнозирования, необходимые для решения профессиональных задач (соотнесено с индикатором ОПК-2.1); возможности использования модуля "Анализ данных" MS Excel и эконометрического пакета EViews; 2 базы данных сети Internet для решения аналитических и исследовательских задач (соотнесено с индикатором ОПК-5.1)
Уметь:
осуществлять выбор инструментальных средств для обработки экономических данных в соответствии с поставленной задачей, анализировать результаты расчетов и обосновывать полученные выводы; оценивать эконометрические модели, анализировать и содержательно интерпретировать результаты эконометрического моделирования; прогнозировать на основе эконометрических моделей поведение экономических агентов, развитие экономических процессов и явлений на микро- и макроуровне (соотнесено с индикатором ОПК-2.2) осуществлять поиск необходимой информации в базах данных сети Internet; использовать средства модуля "Анализ данных" MS Excel и эконометрического пакета EViews для решения аналитических и исследовательских задач (соотнесено с индикатором ОПК-5.2)
Владеть:
навыками эконометрического моделирования и прогнозирования, необходимыми для решения профессиональных задач; средствами анализа и содержательной интерпретации полученных результатов (соотнесено с индикатором ОПК-2.3); способами поиска необходимой информации в сети Internet, средствами модуля "Анализ данных" MS Excel и эконометрического пакета EViews для обработки, анализа экономических данных, эконометрического моделирования и прогнозирования (соотнесено с индикатором ОПК-5.3)

3. СТРУКТУРА И СОДЕРЖАНИЕ ДИСЦИПЛИНЫ

Код занятия	Наименование разделов и тем /вид занятия/	Семестр / Курс	Часов	Компетен-ции	Литература
	Раздел 1. Section 1 «The linear regression model and its specification. Discrete choice models»				
1.1	Topic 1.1 «The Classical Multiple Linear Regression Model» The linear regression model. The ordinary least-squares method (OLS). Extended least squares method (ELS). Dummy variables. Restricted least squares. The maximum -likelihood method. (Using MS Excel and EViews) /Лаб/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
1.2	Topic 1.1 «The Classical Multiple Linear Regression Model» The linear regression model. The ordinary least-squares method (OLS). Extended least squares method (ELS). Dummy variables. Restricted least squares. The maximum -likelihood method. /Пр/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
1.3	Topic 1.1 "Classical multiple linear regression model" /Ср/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7

1.4	Topic 1.2 «Model specification in regression analysis» Multicollinearity and elimination methods. Specification errors and their detection. Choosing the optimal set of regressors and functional forms of the regression dependence. Heteroskedasticity, its causes and methods of detection and elimination. Weighted least squares (WLS). Residual autocorrelation, its causes, detected and elimination methods Endogeneity of variables. The case of correlated regressors and random error. Errors of measurement variables. Instrumental variables. The Hausman test.(Using MS Excel and EViews) /Лаб/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
1.5	Topic 1.2 «Model specification in regression analysis» Multicollinearity and elimination methods. Specification errors and their detection. Choosing the optimal set of regressors and functional forms of the regression dependence. Heteroskedasticity, its causes and methods of detection and elimination. Weighted least squares (WLS). Residual autocorrelation, its causes, detected and elimination methods Endogeneity of variables. The case of correlated regressors and random error. Errors of measurement variables. Instrumental variables. The Hausman test. /Пр/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
1.6	Topic 1.2 «Model specification in regression analysis» /Ср/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
1.7	Topic 1.3 «Logit and Probit models» Discrete dependent variables: nominal, ranked and quantitative. Binary choice models. Probit and Logit models. Interpretation of coefficients in binary choice models. The maximum-likelihood method in Probit and Logit models . Goodness-of-fit testing for models. (Using MS Excel and EViews) /Лаб/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
1.8	Topic 1.3 «Logit and Probit models» Discrete dependent variables: nominal, ranked and quantitative. Binary choice models. Probit and Logit models. Interpretation of coefficients in binary choice models. The maximum-likelihood method in Probit and Logit models . Goodness-of-fit testing for models. /Пр/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
1.9	Topic 1.3 "Logit and Probit models" /Ср/	2	4		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
	Раздел 2. Section 2 «Time series models and panel data models»				
2.1	Topic 2.1 «Time series models» Box-Jenkins models. Distributed lag models (partial adjustment model, adaptive expectations model). The Granger causality test. (Using MS Excel and EViews) /Лаб/	2	4		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
2.2	Topic 2.1 «Time series models» Box-Jenkins models. Distributed lag models (partial adjustment model, adaptive expectations model). The Granger causality test. /Пр/	2	4		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7

2.3	Topic 2.2 «Non-stationary time series» Imaginary regression. The unit root. Unit root tests. Cointegration of time series. Error correction model. (Using MS Excel and EViews) /Лаб/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
2.4	Topic 2.2 «Non-stationary time series» Imaginary regression. The unit root. Unit root tests. Cointegration of time series. Error correction model. /Пр/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
2.5	Topic 2.2 "Time series models. Non-stationary time series" /Ср/	2	6		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
2.6	Topic 2.3 «Panel data» Advantages of using panel data. Difficulties in working with panel data. Error components model. Model specification. Fixed and random individual effects. (Using MS Excel and EViews) /Лаб/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
2.7	Topic 2.3 «Panel data» Advantages of using panel data. Difficulties in working with panel data. Error components model. Model specification. Fixed and random individual effects. /Пр/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
2.8	Topic 2.4 «Models for panel data» Operators «Between» and «Within». Types of estimates. Comparative analysis of estimates. Specification tests for panel data models. The Hausman test. Testing fixed effects. Testing random effects. (Using MS Excel and EViews) /Лаб/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
2.9	Topic 2.4 «Models for panel data» Operators «Between» and «Within». Types of estimates. Comparative analysis of estimates. Specification tests for panel data models. The Hausman test. Testing fixed effects. Testing random effects. /Пр/	2	2		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
2.10	Topic 2.4 «Models for panel data» /Ср/	2	8		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
2.11	Topic 2.5 "Simultaneous equations models" /Ср/	2	18		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7
2.12	/Зачёт/	2	0		Л1.1 Л1.2 Л1.3Л2.1 Л2.2 Л2.3 Л2.4 Л2.5 Л2.6 Л2.7

4. ФОНД ОЦЕНОЧНЫХ СРЕДСТВ

Структура и содержание фонда оценочных средств для проведения текущей и промежуточной аттестации представлены в Приложении 1 к рабочей программе дисциплины.

5. УЧЕБНО-МЕТОДИЧЕСКОЕ И ИНФОРМАЦИОННОЕ ОБЕСПЕЧЕНИЕ ДИСЦИПЛИНЫ

5.1. Основная литература

	Авторы, составители	Заглавие	Издательство, год	Колич-во

	Авторы, составители	Заглавие	Издательство, год	Колич-во
Л1.1	Путко Б. А., Кремер Н. Ш., Кремер Н. Ш.	Эконометрика: учебник	Москва: Юнити, 2012	https://biblioclub.ru/index.php?page=book&id=118251 неограниченный доступ для зарегистрированных пользователей
Л1.2	Величко, А. С.	Эконометрика в Eviews: учебно-методическое пособие	Саратов: Вузовское образование, 2016	http://www.iprbookshop.ru/47403.html неограниченный доступ для зарегистрированных пользователей
Л1.3	Мариев, О. С., Анцыгина, А. Л.	Прикладная эконометрика для макроэкономики = Applied econometrics for macroeconomics: учебное пособие	Екатеринбург: Уральский федеральный университет, ЭБС АСВ, 2014	http://www.iprbookshop.ru/69760.html неограниченный доступ для зарегистрированных пользователей

5.2. Дополнительная литература

	Авторы, составители	Заглавие	Издательство, год	Колич-во
Л2.1		Журнал "Вопросы статистики"	,	1
Л2.2	Картаев Ф. С., Лукаш Е. Н.	Эконометрика	Москва: Проспект, 2014	http://biblioclub.ru/index.php?page=book&id=276567 неограниченный доступ для зарегистрированных пользователей
Л2.3		Прикладная эконометрика: журнал	Москва: Университет Синергия, 2017	https://biblioclub.ru/index.php?page=book&id=467339 неограниченный доступ для зарегистрированных пользователей
Л2.4	Ивченко, Ю. С.	Эконометрика в MS EXCEL: лабораторный практикум	Саратов: Ай Пи Эр Медиа, 2018	http://www.iprbookshop.ru/70785.html неограниченный доступ для зарегистрированных пользователей
Л2.5	Ершова, Н. А., Павлов, С. Н.	Современная эконометрика: учебное пособие	Москва: Российский государственный университет правосудия, 2018	http://www.iprbookshop.ru/78311.html неограниченный доступ для зарегистрированных пользователей
Л2.6	Яковлева, А. В.	Эконометрика: учебное пособие	Саратов: Научная книга, 2019	http://www.iprbookshop.ru/81090.html неограниченный доступ для зарегистрированных пользователей
Л2.7	Чечерова, Н. А.	Эконометрика: лабораторный практикум	Комсомольск-на-Амуре, Саратов: Амурский гуманитарно-педагогический государственный университет, Ай Пи Ар Медиа, 2019	http://www.iprbookshop.ru/85837.html неограниченный доступ для зарегистрированных пользователей

5.3 Профессиональные базы данных и информационные справочные системы

1. База данных Центрального банка РФ http://cbr.ru/hd_base/
2. Базы данных Росстата https://gks.ru/databases
3. Центральная база статистических данных https://www.gks.ru/dbscripts/cbsd/dbinet.cgi
4. Базы данных Ростовстата https://rostov.gks.ru/folder/56777, https://rostov.gks.ru/folder/29957
5. Единая межведомственная информационно-статистическая система https://www.fedstat.ru/

6. Базы данных ВЦИОМ https://wciom.ru/?id=79, https://wciom.ru/?id=1130
7. Портал открытых данных РФ https://data.gov.ru/
8. Консунтант+
5.4. Перечень программного обеспечения
Econometric Views 6.0
MS Excel
5.5. Учебно-методические материалы для студентов с ограниченными возможностями здоровья
При необходимости по заявлению обучающегося с ограниченными возможностями здоровья учебно-методические материалы предоставляются в формах, адаптированных к ограничениям здоровья и восприятия информации. Для лиц с нарушениями зрения: в форме аудиофайла; в печатной форме увеличенным шрифтом. Для лиц с нарушениями слуха: в форме электронного документа; в печатной форме. Для лиц с нарушениями опорно-двигательного аппарата: в форме электронного документа; в печатной форме.

6. МАТЕРИАЛЬНО-ТЕХНИЧЕСКОЕ ОБЕСПЕЧЕНИЕ ДИСЦИПЛИНЫ (МОДУЛЯ)

Помещения для проведения всех видов работ, предусмотренных учебным планом, укомплектованы необходимой специализированной учебной мебелью и техническими средствами обучения. Для проведения лекционных занятий используется демонстрационное оборудование. Лабораторные занятия проводятся в компьютерных классах, рабочие места в которых оборудованы необходимыми лицензионными программными средствами и выходом в Интернет.

7. МЕТОДИЧЕСКИЕ УКАЗАНИЯ ДЛЯ ОБУЧАЮЩИХСЯ ПО ОСВОЕНИЮ ДИСЦИПЛИНЫ (МОДУЛЯ)

Методические указания по освоению дисциплины представлены в Приложении 2 к рабочей программе дисциплины.

Приложение 1

ФОНД ОЦЕНОЧНЫХ СРЕДСТВ

1. Описание показателей и критериев оценивания компетенций на различных этапах их формирования, описание шкал оценивания

1.1 Критерии оценивания компетенций:

ЗУН, составляющие компетенцию	Показатели оценивания	Критерии оценивания	Средства оценивания
ОПК-2: Способен применять продвинутые инструментальные методы экономического анализа в прикладных и (или) фундаментальных исследованиях			
Знать: методы сбора, анализа и обработки данных, эконометрического моделирования и прогнозирования, необходимые для решения профессиональных задач	Формулирует ответы на поставленные вопросы; решает тестовое задание в части методов сбора, анализа и обработки данных, эконометрического моделирования и прогнозирования	Полнота и содержательность ответа; умение приводить примеры, корректность формулировок и выводов.	Тест письменный (варианты 1-10); Вопросы для коллоквиума (1-34); Задания к зачету (1-10)
Уметь: осуществлять выбор инструментальных средств для обработки экономических данных в соответствии с поставленной задачей, анализировать результаты расчетов и обосновывать полученные выводы; оценивать эконометрические модели, анализировать и содержательно интерпретировать результаты эконометрического моделирования; прогнозировать на основе эконометрических	Решает разноуровневые задачи, формирует отчет по заданию к лабораторной работе в части оценивания эконометрических моделей и прогнозирования на основе эконометрических моделей социально-экономических процессов	Полнота и содержательность решения с соблюдением необходимой последовательности расчетов; правильность и точность полученных результатов; качество анализа и интерпретации полученных результатов и выводов; качество оформления	Кейс- Problem; Комплект разноуровневых задач (1-10); Задания к лабораторным работам (лаб. Работы 1-5); Задания к зачету (1-10)

моделей поведение экономических агентов, развитие экономических процессов и явлений на микро- и макроуровне			
Владеть: навыками эконометрического моделирования и прогнозирования, необходимыми для решения профессиональных задач; средствами анализа и содержательной интерпретации полученных результатов	Решает разноуровневые задачи, формирует отчет по заданию к лабораторной работе с помощью инструментальных средств оценивания эконометрических моделей	Обоснованность выбора и использования инструментальных средств; полнота и содержательность решения с соблюдением необходимой последовательности расчетов; правильность и точность, качество анализа и интерпретации полученных результатов и выводов; качество оформления	Кейс- Problem; Комплект разноуровневых задач (1-10); Задания к лабораторным работам (лаб. Работы 1-5); Задания к зачету (1-10)
ОПК-5: Способен использовать современные информационные технологии и программные средства при решении профессиональных задач			
Знать: возможности использования модуля "Анализ данных" MS Excel и эконометрического пакета EViews; 2 базы данных сети Internet для решения аналитических и исследовательских задач	Знает возможности современных информационных технологий в области эконометрики. Аргументирует применение информационных технологий при проведении расчетов. Объясняет основные команды пакета прикладных программ.	Умение пользоваться базами данных; правильность выбора и использования средств модуля "Анализ данных" MS Excel и эконометрического пакета EViews для решения аналитических и исследовательских задач при выполнении задания к лабораторной работе	Тест письменный (варианты 1-10); Вопросы для коллоквиума (1-34); Задания к зачету (1-10)
Уметь: осуществлять поиск необходимой информации в базах данных сети Internet; использовать	Решает разноуровневые задачи, формирует отчет по заданию к лабораторной работе в	Самостоятельность и рациональность выбора данных, степень обоснованности	Кейс- Problem; Комплект разноуровневых задач (1-10);

средства модуля "Анализ данных" MS Excel и эконометрического пакета EViews для решения аналитических и исследовательских задач	части поиска информации в сети Internet и использования инструментальных средств	выбора инструментальных средств; полнота и содержательность решения с соблюдением необходимой последовательности расчетов; правильность и точность полученных результатов; качество анализа и интерпретации полученных результатов и выводов; качество оформления	Задания к лабораторным работам (лаб. Работы 1-5); Задания к зачету (1-10)
Владеть: способами поиска необходимой информации в сети Internet, средствами модуля "Анализ данных" MS Excel и эконометрического пакета EViews для обработки, анализа экономических данных, эконометрического моделирования и прогнозирования	Решает разноуровневые задачи, формирует отчет по заданию к лабораторной работе с использованием современных информационно-коммуникационных технологий и глобальных информационных ресурсов, а также инструментальных средств для обработки, анализа экономических данных, эконометрического моделирования и прогнозирования	Целенаправленность поиска и отбора информации; правильность использования средств модуля "Анализ данных" MS Excel и эконометрического пакета EViews для обработки и анализа данных; полнота и содержательность решения с соблюдением необходимой последовательности расчетов; самостоятельность и рациональность выбора данных; правильность и точность полученных результатов; качество анализа и интерпретации полученных результатов и выводов; качество	Кейс- Problem; Комплект разноуровневых задач (1-10); Задания к лабораторным работам (лаб. Работы 1-5); Задания к зачету (1-10)

		оформления	

1.2. Шкала оценивания:

Текущий контроль успеваемости и промежуточная аттестация осуществляется в рамках накопительной балльно-рейтинговой системы в 100-балльной шкале.

Промежуточная аттестация осуществляется по следующей шкале:

- 50-100 баллов (зачтено)

- 0-49 баллов (не зачтено).

2. Типовые контрольные задания или иные материалы, необходимые для оценки знаний, умений, навыков и (или) опыта деятельности, характеризующих этапы формирования компетенций в процессе освоения образовательной программы

Задания к зачету

ЗАДАНИЕ К ЗАЧЕТУ №1

1. Operators «Between» and «Within». Types of estimates. Comparative analysis of estimates. Specification tests for panel data models. The Hausman test. Testing fixed effects. Testing random effects.

2. The linear regression model. The ordinary least-squares method (OLS). Extended least squares method (ELS).

Problem

The researcher uses the binary choice logit model to find out how the likelihood of being unemployed depends on work experience and education. The researcher interviewed 1000 economically active citizens aged 21 to 28 years and received data on the following variables: Unemployed - a dummy variable equal to one if the respondent is unemployed; Experience - the respondent's work experience (in years); Education - the duration of the respondent's education (in years). The table shows the results of model estimation:

Dependent Variable: Unemployed

	Logit
Experience	−0.20
	(0.03)
Education	−0.10
	(0.02)
Constant	−0.60
	(0.12)

Question: Aristarkh Petrov studied at school for 10 years and another 4 years in a bachelor's degree. He has no work experience yet. How likely is he to be unemployed?

ЗАДАНИЕ К ЗАЧЕТУ №2

1. Heteroskedasticity, its causes and methods of detection and elimination. Weighted least squares (WLS).

2. Cointegration of time series. Error correction model.

Problem

The questions in this assignment are based on the following experiment: 400 drivers, selected at random, were asked to take a special driving test. For each driver, the following data were collected: Pass - a dummy variable equal to one if the driver passed the test, Male - a dummy variable equal to one if the driver is a man, and equal to 0 if the driver is a woman, Experience - driving experience (in years). The table presents the results of seven models estimated on the basis of the available data.

Dependent Variable: Pass							
	Probit	Logit	Linear Probability	Probit	Logit	Linear Probability	Probit
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Experience	0.031	0.040	0.006				0.041
	(0.009)	(0.016)	(0.002)				(0.156)
Male				−0.333	−0.622	−0.071	−0.174
				(0.161)	(0.303)	(0.034)	(0.259)
Male*Experience							−0.015
							(0.019)
Constant	0.712	1.059	0.774	1.282	2.197	0.900	0.806
	(0.126)	(0.221)	(0.034)	(0.124)	(0.242)	(0.022)	(0.200)

Question: Is the likelihood of passing the test dependent on driving experience (use results from columns (2) and (7))?

ЗАДАНИЕ К ЗАЧЕТУ №3

1. The maximum-likelihood method.
2. Error components mode. Model specification. Fixed and random individual effects.

Problem

The dependence of the average per capita alcohol consumption in the countries of the world on various factors is investigated.

Model 1:

$ALCO_i=\beta_1+\beta_2GDP_i+\beta_3MUSL_i+\beta_4BUDD_i+\beta_5HINDU_i+\varepsilon_i$,

where ALCOi is the per capita consumption of pure alcohol per person (l), GDPi is the GDP per capita (US dollars), MUSLi, BUDDi, HINDUi are the shares of the population professing Muslim, Buddhist and Hinduism, respectively (in% of the total population). In the course of the OLS estimation of the model based on data from 50 countries, the following results were obtained: sum of squares residuals ESS = 200, explained sum of squares RSS = 300.

Also, to test the hypothesis that religion does not have a significant effect on alcohol consumption, the parameters of the second model were estimated:

Model No. 2:

$ALCO_i=\beta_1+\beta_2GDP_i+\varepsilon_i$.

In the second model, compared to the first, the RSS value has changed by 100. How much is the adjusted R2 in the second model?

ЗАДАНИЕ К ЗАЧЕТУ №4

1. Binary choice models. Probit and Logit models. Interpretation of coefficients in binary choice models.
2. Residual autocorrelation, its causes, detected and elimination methods.

Problem

The researcher evaluated the probit model. He took the individual's preferred type of ice cream, pistachio or chocolate, as the variable to be explained. Namely, yi = 1, if the i-th respondent likes pistachio more and yi = 0, if - chocolate. As an explanatory variable, the researcher took the number of chocolates eaten by the respondent on a monthly basis. Got an estimate for a hidden variable: $\widehat{y_i^*} = 2 - 0.3x_i$.

Estimate the likelihood that an individual who eats 6 chocolates a month prefers pistachio ice cream.

ЗАДАНИЕ К ЗАЧЕТУ №5

1. Dummy variables. Restricted least squares.
2. Box-Jenkins models.

Problem

Based on 40 observations, the model of the dependence of wagei ($) wages on the duration of schoolingi (years) and work experience (years) was estimated. The estimated model is: $\widehat{wage_i} = 250 + 15educ_i + 55exper_i$. *ESS=125, TSS=200*. The researcher decided to add mschoolingi and fschoolingi parents' education (years) to the model, after which ESS = 175. At the 1% significance level, when testing the hypothesis about the influence of the duration of parental education on the wages of their child, determine what is the observed value of the test statistics?

ЗАДАНИЕ К ЗАЧЕТУ №6

1. Specification errors and their detection. Choosing the optimal set of regressors and functional forms of the regression dependence.
2. The Granger causality test

Problem

The agricultural specialist believes that the consumption of beef in the regions (y) in tonnes per year depends on the price of beef (x1) rubles per kilogram, the price of pork (x2) rubles per kilogram, the price of chicken (x3) rubles per kilogram and average per capita cash income (x4). The following regression model is derived from a sample of 30 regions:

$$\log y = -0.024 - 0.529\log x_1 + 0.217\log x_2 + 0.193\log x_3 + 0.0416\log x_4$$

$$(0.168) \qquad (0.103) \qquad (0.106) \qquad (0.163)$$

$$R^2 = 0.683$$

a) Interpret the coefficient at *log* x_1.

b) Check at the 1% significance level the null hypothesis that the coefficient at *log* x_4 in the population is zero.

ЗАДАНИЕ К ЗАЧЕТУ №7

1. Residual autocorrelation, its causes, detected and elimination methods.
2. Endogeneity of variables. The case of correlated regressors and random error. Errors of measurement variables. Instrumental variables. The Hausman test.

Problem

The researcher analyzes the dependence of consumption (c) on disposable income (y) based on a simple empirical model: $c_i=\beta y_i+\varepsilon_i$, ε_i - independent normally distributed random variables with zero mean and variance $\square(\square_\square) = \square^2 \cdot \square_\square^2$.

The researcher collected data on two thousand households and performed the following preliminary calculations:

$\sum_{\square=1}^{2000} \square_\square = 2000;\ \sum_{\square=1}^{2000} \square_\square = 1000;\ \sum_{\square=1}^{2000} \square_\square^2 = 1450;\ \sum_{\square=1}^{2000} \square_\square \square_\square = 950;\ \sum_{\square=1}^{2000} \frac{\square_\square}{\square_\square} = 1050;\ \sum_{\square=1}^{2000} \frac{\square_\square}{\square_\square} = 1550.$

Using whatever data is available to you, calculate an effective estimate of the marginal propensity to consume.

ЗАДАНИЕ К ЗАЧЕТУ №8

1. Discrete dependent variables: nominal, ranked and quantitative. Binary choice models. Probit and Logit models. Interpretation of coefficients in binary choice models.
2. Imaginary regression. The unit root. Unit root tests.

Problem

The dependence of the average per capita alcohol consumption in the countries of the world on various factors is investigated.

Model 1:

$ALCO_i=\beta_1+\beta_2GDP_i+\beta_3MUSL_i+\beta_4BUDD_i+\beta_5HINDU_i+\varepsilon_i$,

where ALCOi is the per capita consumption of pure alcohol per person (l), GDPi is the GDP per capita (US dollars), MUSLi, BUDDi, HINDUi are the shares of the population professing Muslim, Buddhist and Hinduism, respectively (in% of the total population). In the course of the OLS-estimation of the model based on data from 50 countries, the following results were obtained: sum of squares of residuals ESS = 200, explained sum of squares RSS = 300.

Also, to test the hypothesis that religion does not have a significant effect on alcohol consumption, the parameters of the second model were estimated:

Model No. 2:

$ALCO_i=\beta_1+\beta_2GDP_i+\varepsilon_i$.

In the second model, compared to the first, the RSS value has changed by 100. How much is the adjusted R2 in the second model?

ЗАДАНИЕ К ЗАЧЕТУ №9

1. Multicollinearity and elimination methods.
2. Distributed lag models (partial adjustment model, adaptive expectations model).

Problem

Based on 35 observations, a model of the dependence of wagei ($) wages on the duration of schoolingi (years) and work experiencei (years) was estimated. The estimated model is: $\widehat{wage}_i = 400 + 25\,school_i + 60\,exper_i$. *ESS=130, TSS=210*. The researcher decided to add mschoolingi and fschoolingi parents' education (years) to the model, after which ESS = 180. At the 10% significance level, when testing the hypothesis about the influence of the duration of parental education on the wages of their child, indicate the number of restrictions that are equated to zero in the formulation of the null hypothesis?

ЗАДАНИЕ К ЗАЧЕТУ №10

1. Heteroskedasticity, its causes and methods of detection and elimination. Weighted least squares (WLS).

2. Panel data. Advantages of using panel data. Difficulties in working with panel data. Error components model.

Problem

Based on 2040 observations, a model of the dependence of the cost of an apartment pricei (at $ 1000) on the floor area was estimated *livesp*$_i$: $\widehat{price}_i = 90 + 1.8 livesp_i$. When constructing a 95% confidence interval for $E(price_f|livesp=70)$, what is equal to $\widehat{E}(\widehat{price}_f|x)$, if $\hat{v}^2 = 1259.265$, and the covariance matrix has the following form:

$$\widehat{Var}(\hat{\beta}|X) = \begin{pmatrix} (constant) & (constant) & livesp \\ (constant) & 21.9 & -0.46 \\ livesp & -0.46 & 0.01 \end{pmatrix}.$$

Round to one decimal place.

Критерии оценивания:

Максимальное количество баллов – 100.

Задание к зачету содержит 2 вопроса и 1 задачу. Баллы выставляются по каждому заданию в отдельности и суммируются.

Каждый вопрос оценивается отдельно, максимально в 20 баллов.

Максимальная общая оценка – 40 баллов. Критерии оценивания отдельного вопроса:

- 10-20 баллов. Ответ на вопрос верный; продемонстрировано наличие глубоких исчерпывающих / твердых и достаточно полных знаний, грамотное и логически стройное изложение материала при ответе, возможны отдельные погрешности и ошибки, уверенно исправленные и после дополнительных вопросов; продемонстрировано наличие глубоких исчерпывающих / твердых и достаточно полных знаний, грамотное и логически стройное изложение материала при ответе.
- 0-9 балла. Ответ на вопрос лишь частично верен, продемонстрирована неточность и неуверенность ответов на дополнительные и наводящие вопросы, либо ответ на вопрос не верен, продемонстрирована неуверенность и неточность ответов на дополнительные и наводящие вопросы.

Problem оценивается максимально в 60 баллов:

Каждая Problem оценивается максимально в 25 баллов. Критерии оценивания задачи:

- 15-30 баллов. Problem решена в полном объеме, выбраны верные инструментальные методы и приемы решения, проведены верные расчеты, сделан полный, содержательный вывод по результатам проведенных расчетов; либо Problem решена в полном объеме с небольшими погрешностями, выбраны верные инструментальные методы и приемы решения, проведены верные расчеты, сделан полный, содержательный вывод по результатам проведенных расчетов, в расчетах и выводах содержатся незначительные ошибки.
- 0-14 балла. Problem решена частично, частично выбраны верные инструментальные методы и приемы решения, проведены частичные расчеты, сделан вывод по результатам проведенных расчетов с погрешностями либо Problem не решена или решена частично, частично выбраны необходимые инструментальные методы и приемы решения, расчеты не проведены или проведены частично, вывод по результатам проведенных расчетов не сделан или ошибочен.

Зачет выставляется на основании итоговой суммы баллов, набранных студентом:

- 50-100 баллов «зачтено»;
- 0-49 баллов «не зачтено».

Тест письменный

Вариант 1

1. (Choose more than one answer) The types of econometric models are based on the type of model ...

A) systems econometric equations

B) nonlinear regression

C) time series

D) linear regression

2. (Choose more than one answer) Among the factors determining the dynamics of the time series can be called ...

A) The dynamics and cumulative factors

B) autocorrelation and trend

C) Seasonal fluctuations and the trend

D) trends and random factors

3. (Choose more than one answer) The econometric model of the form of the Cobb-Douglas $y = ax_1^{\alpha_1} x_2^{\alpha_2} \varepsilon$ linearly includes

A) Variable x_2

B) Variable y

C) Variable x_1

D) Parameter a

4. The value of multiple correlation coefficient is in the interval

A) [0, 1]

B) [-1, 0]

C) [-1, 1]

D) [-2, 2]

5. An indicator on the basis of which can be checked essentiality (significance) of individual parameter regression equation is not ...

A) The total variance of the dependent variable

B) Student's t-test

C) Confidence interval

D) Fisher criterion

6. (Choose more than one answer) The value of the coefficient of determination was 0.9, therefore ...

A) regression equation explained 90% of the resultant variable dispersion

B) the proportion of the residual variance of the dependent variable y is 90% of its total dispersion

C) the proportion of the residual variance of the dependent variable y was 10% of its total dispersion

D) regression equation explains 10% of the resultant variable dispersion

7. (Choose more than one answer) The matrix of pairwise linear correlation coefficients can be used for the following tasks:

A) Detecting variables multicollinearity

B) Determining the tightness the linear relationships between variables

C) Calculation equation parameter estimates

D) Determination of the significance of the coefficient of determination

8. To detect autocorrelation in the regression equation, the following statistics is used ...

A) Student

B) Fisher

C) Bartlett

D) Durbin-Watson

9. When evaluating the regression linear equation parameters

using the method of least squares the ratio $\sum_i \left(y_i - \hat{y}_i \right)^2$ …

A) is integrated
B) is minimized
C) is set to zero
D) is maximized

10. Random component in the econometric model ...

A) is applied only in linear models

B) does not make economic sense

C) reflects the impact on the effective sign of random factors

D) is a negligible quantity, which can be neglected

Вариант 2

1. When estimating the parameters of a linear regression equation using the least squares method, the ratio $\sum_i \left(y_i - \hat{y}_i\right)^2$ …

A) Integrate; B) Minimize; C) Equate to zero; D) Maximize.

2. An explicit formula for the estimates of the coefficients of the LSM, obtained using linear algebra, has the form:

А) $\hat{\beta} = (X'X)^{-1}X'y$; Б) $\hat{\beta} = (X'y)^{-1}X'X$; В) $\hat{\beta} = (X^{-1}X)^{-1}X'y$; Г) $\sum \frac{x_i y_i}{x_i^2}$.

3. Endogeneity occurs when

1) $Var(\varepsilon_i) \neq 0$;

2) $Cov(\varepsilon_i, x_i) \neq 0$;

3) $Cov(\varepsilon_i, x_i) = 0$;

4) $Cov(z_i, x_i) \neq 0$.

4. (Please select more than one answer) The coefficient of determination was 0.9, therefore ...

A) 90% of the variance of the effective trait is explained by the regression equation

B) the share of the residual variance of the dependent variable y in its total variance was 90%

C) the share of the residual variance of the dependent variable y in its total variance was 10%

D) the regression equation explains 10% of the variance of the effective trait

5. For 30 observations, the following regression equation was estimated (the standard deviations of the coefficient estimates are indicated in parentheses):

$$\widehat{y_i} = \underset{(1,0)}{1,5} - \underset{(0,4)}{0,9} \cdot x_i^{(1)} + \underset{(0,01)}{0,04} \cdot x_i^{(2)} + \underset{(0,02)}{0,09} \cdot x_i^{(3)} + \underset{(0,6)}{2,0} \cdot x_i^{(4)},\ R^2 = 0,59$$

Check (at a 5% significance level) the hypothesis that all coefficients of the variables in the equation are simultaneously equal to zero.

A) The calculated statistics will be 8.99 and the tested hypothesis should be accepted;

B) The calculated statistics will be 8.99 and the tested hypothesis should be rejected;

C) The calculated statistics will be 0.23 and the tested hypothesis should be rejected;

D) The calculated statistic will be 0.23 and the hypothesis being tested should be accepted.

6. The researcher obtained the following results of estimating the parameters of a linear multiple regression model using the least squares method based on data from two thousand observations:

$$\hat{y}_i = \underset{(0,12)}{0,21} + \underset{(1,95)}{6,72}x_i + \underset{(1,97)}{8,81}z_i$$

Corresponding standard errors are indicated in parentheses under the coefficient estimates. Using the 5% significance level, test the insignificance of the coefficients of the variables in this equation. (The corresponding critical t-statistic at the 5% significance level is 1.96.)

a) Only the coefficient at the variable xi is significant.

b) Only the coefficient at the variable zi is significant.

c) Both the coefficient at the variable xi and the coefficient at the variable zi are significant.

d) None of the coefficients are significant.

7. What is one of the worst consequences of autocorrelation?

1) It can lead to the inconsistency of standard errors;

2) It can lead to endogeneity;

3) It can lead to conditional heteroscedasticity;

4) It can lead to multicollinearity.

8. The researcher is studying the effectiveness of a new medicine for altitude sickness, which people face while at high altitude. He collected data on 2,000 climbers, half of whom, at altitude, took the new medication, and the other half did not. For each of the climbers, as a result of a comprehensive examination, the health level was measured according to a special 10-point scale (1 - very bad, 10 - very good).

After some simple calculations, the researcher obtained the following results:

• For climbers who took the medicine, the average health level is 4 points, with a sample variance of 2.

• For climbers who did not take medication, the average health level is 7 points, with a sample variance of 2.

In addition to calculating the means, our researcher wants to evaluate the regression:

$y_i=\alpha_1+\alpha_2 \cdot x_i+\varepsilon_i$

where xi is a dummy variable equal to one if the i-th climber took medicine, and equal to zero otherwise, yi is the health level of the i-th climber. Using the information available, help the researcher compute the estimates of the coefficients in such a regression.

Consider three options for implementing an experiment with drugs.

Option 1: each climber participating in the experiment decides for himself whether to take the medicine or not.

Option 2: climbers participate in a lottery, during which it is randomly determined which of them will take medicine and who will not.

Option 3: Female climbers take medication, but male climbers do not.

In which case will the regressor in the equation be exogenous?

1) In case of implementation of option 1;

2) In case of implementation of option 2;

3) In case of implementation of option 3;

4) In each of the three cases.

9. For two types of products B and C, the model of the dependence of specific fixed costs on the volume of products is as follows:

yB = 80 + 0.7x yC = 40x0.5

Determine the coefficients of elasticity for each type of product and explain their meaning.

10. Choose the correct statement:

A) If we have theoretical grounds to believe that there is a dependence on the z variable, and you are evaluating the regression, it is not significant, it is better to leave it.

B) If we have theoretical grounds to believe that there is a dependence on the z variable, and you are evaluating the regression, it is not significant, it is better to exclude it.

C) If a variable is significant, but the theory says: there should be no dependence on this variable, then it is better to exclude it.

Вариант 3

1. The square of what coefficient in paired regression indicates the proportion of the variance of one random variable due to the variation of the other?

A) Coefficient of determination; B) Pairwise correlation coefficient;

C) Partial correlation coefficient; D) Multiple correlation coefficient.

2. A correlation coefficient equal to –1 means that between the variables.

A) there is no linear connection, B) there is a linear connection;

C) functional inverse relationship;D) the situation is not defined.

A study is being conducted at the cinema on what kind of popcorn viewers prefer.

3. Find the correct statement. When selecting factors by gradually reducing their number,

A) Fisher's, Student's, Durbin-Watson's criteria, multiple determination coefficient.

B) Coefficients of paired and multiple correlation of the resulting indicator and factors, Fisher's and Student's tests.

C) Coefficients of paired and multiple correlation of the resulting indicator and factors, the Darbin-Watson, Fisher and Student tests.

D) Durbin-Watson, Student's criteria, multiple correlation and determination coefficients.

E) Fisher's, Student's criteria, multiple correlation and determination coefficients.

4. Standard quality indicators of models ...

A) act in the same direction: the lower the criterion value, the worse the model.

B) act in the same direction: the lower the criterion value, the better the model.

C) act in different directions: depending on the criterion.

D) act in the same direction: the higher the value of the criterion, the better the model.

A multiple regression equation is given. Check the significance of the coefficients.

5. Within the framework of the assumptions of the classical linear multiple regression model, the researcher using the least squares method based on data on ten thousand observations obtained the following results of estimating the parameters of the equation:

$$\widehat{\ln y_i} = 0{,}34 + 0{,}12 * \ln x_i + 0{,}71 * \ln z_i, \;\; R^2 = 0{,}4.$$

What can be said about the significance of the resulting equation?

(The corresponding critical value of the F-statistic at the 5% significance level is 3.00, and at the 1% significance level is 4.61.)

A) When using the 5% significance level, a conclusion should be made about the significance of the equation. When using the 1% level of significance, it should be concluded that the equation is not significant.

B) When using the 1% significance level, a conclusion should be made about the significance of the equation. When using the 5% level of significance, it should be concluded that the equation is insignificant.

C) Using both the 5% and 1% significance levels, it should be concluded that the equation is significant.

D) When using both 5% and 1% significance levels, it should be concluded that the equation is insignificant.

6. Benjamin examines the influence of various factors on the wages of people living in Russia. Based on 1,000 observations, he estimated the regression of wages (wagei, in thousands of rubles) from a person's education (educi, in years), education of this person's mother (mother.educi, in years), and dummy for work experience (experi: 1 - if more than 5 years, 0 - if less than 5 years). Benjamin got the following results:

$$\widehat{wage}_i = 10 + 20 \cdot educ_i + 5 \cdot mother.educ_i + 15 \cdot exper_i$$

Benjamin has concerns about multicollinearity in the data. To test his guess, he evaluated the auxiliary regressions and got:

$$\widehat{educ_i} = 11 + 2 \cdot mother.educ_i - 5 \cdot exper_i, R^2 = 0.97$$

$$\widehat{mother.educ_i} = 10 + 10 \cdot educ_i + 3 \cdot exper_i, R^2 = 0.93$$

$$\widehat{exper_i} = -8 \cdot educ_i + 9 \cdot mother.educ_i, R^2 = 0.3$$

After calculating the inflation-variance coefficients for all the auxiliary regressions, what conclusion should Benjamin draw?

A) There is multicollinearity between a person's education and his work experience, these variables are dependent among themselves, but not related to the education of the mother;

B) There is multicollinearity between the education of a mother and her child and work experience, all these variables are dependent on each other;

C) There is a multicollinearity between the education of a mother and her child, these variables are dependent among themselves, but not related to work experience;

D) There is multicollinearity between the mother's education and work experience; these variables are dependent on each other, but not related to the child's education.

7. Make a conclusion. The values of standard errors for the regression coefficients are indicated in parentheses.

□ = *54,3* +1,7□*1*+ 0,3□*2* □*табл* =2,26.

(3,85) (0,7) (0,1)

8. The results showed that species A preferred 65% plus or minus 3%. What does “plus or minus 3%” mean?

A) Three percent of viewers changed their preferences in favor of popcorn A.

B) 3% of all viewers were surveyed.

C) The true proportion of popcorn type A lovers could be determined if 3% more viewers were surveyed.

D) The true proportion of popcorn popcorn lovers with a fixed confidence level ranges from 62 to 68 percent.

E) Three percent of the sample results are sloppy and should be discarded.

9. (Please select several answers) Among the factors that determine the dynamics of the time series are ...

A) Dynamics and cumulative factors B) Autocorrelation and trend

B) Seasonal fluctuations and trend D) Trend and random factors

10. The researcher evaluates the parameters of the model $y_i = \beta_1 + \beta_2 * x_i + \varepsilon_i$ using two-step least squares (2LS), using the variable w as the tool for the variable x. What requirements must the instrumental variable satisfy for the obtained estimate of the coefficient β2 to be consistent?

а) $Cov(w_i, \varepsilon_i) = 0,\ Cov(w_i, x_i) \neq 0$
б) $Cov(w_i, \varepsilon_i) \neq 0,\ Cov(w_i, x_i) = 0$
в) $Cov(w_i, \varepsilon_i) \neq 0,\ Cov(w_i, x_i) \neq 0$
г) $Cov(w_i, \varepsilon_i) = 0,\ Cov(w_i, x_i) = 0$

Вариант 4

1. How is the regression coefficient b1 interpreted in a linear model?

A) Coefficient of elasticity;

B) Tangent of the slope of the regression line;

C) The value of the effective trait with a zero value of the factor.

2. Student's criterion is intended for ...

A) Determination of the statistical significance of each of the coefficients of the regression equation.

B) Determination of the economic significance of each of the coefficients of the regression equation.

C) Determination of the statistical significance of the model as a whole based on the aggregate reliability of all its coefficients.

D) Determining the economic significance of the regression model as a whole.

E) None of the statements A-D is correct.

3. The random component in the econometric model ...

A) Applicable only in linear models

B) Does not make economic sense

C) Reflects the influence of random factors on the effective sign

D) Is a negligible quantity that can be neglected

3. Within the framework of the assumptions of the classical linear multiple regression model, the researcher using the least squares method based on data on ten thousand observations obtained the following results of estimating the parameters of the equation:

$$\widehat{\ln y_i} = -0,01 + 0,06 * \ln x_i + 0,04 * \ln z_i, \quad R^2 = 0,2.$$

What can be said about the significance of the resulting equation?

(The corresponding critical value of the F-statistic at the 5% significance level is 3.00, and at the 1% significance level is 4.61.)

A) When using the 5% significance level, a conclusion should be made about the significance of the equation. When using the 1% level of significance, it should be concluded that the equation is not significant.

B) When using the 1% significance level, a conclusion should be made about the significance of the equation. When using the 5% level of significance, it should be concluded that the equation is insignificant.

C) Using both the 5% and 1% significance levels, it should be concluded that the equation is significant.

D) When using both 5% and 1% significance levels, it should be concluded that the equation is insignificant.

4. Based on the series of data for variables X and Y, the regression equation is constructed:

$$\hat{y} = a_1 + a_2 x = 5 + 1{,}25x .$$

If x = 2, then the elasticity of the resulting indicator y relative to the factor x:

A) 1.25. B) 7.5. B) 0.33. D) 4.6875. D 2.

6. The researcher analyzes the model $y_i = \alpha + \beta x_i + \varepsilon_i$, for which all the prerequisites of the classical linear multiple regression model are satisfied with one exception: the variance of the random error εi has the form $V(\varepsilon_i) = \sigma_0^2 x_i^2$. If the researcher uses the usual least squares method to estimate the coefficients of the model, then his estimates will be:

A) displaced and effective; B) biased and ineffective;

B) unbiased and effective; D) unbiased and ineffective.

7. The equation of multiple regression is given. Check the significance of the coefficients. Make a conclusion. The values of standard errors for the regression coefficients are indicated in parentheses.

□ = *124,3* +1,12□*1*-0,53□*2* □*табл* =2,26.

(385) (0,3) (0,6)

8. The coefficient of the regression equation shows ...

A) How much will the result change when the factor changes by 1%.

B) How much% will the factor change when the result changes by 1%.

C) How many units. the result will change when the factor changes by 1 unit.

D) How many units. the factor will change when the result changes by 1 unit.

E) How many times will the result change when the factor changes by 1 unit.

9. Let Y be the turnover of the store, million rubles, X1 - retail space, thousand square meters, X2 - the average number of visitors per day, thousand people.

$$\hat{y} = -0{,}832 + 4{,}743 x_1 + 0{,}175 x_2 .$$

What would be the turnover of a store if it is located in a relatively busy location with 20,000 visitors and a retail space of 1,000 square meters?

A. 8242.168 million rubles. B. 8.243 million rubles.

B. 7.411 million rubles. G. 3.911 million rubles.

E. All answers in nos. A-D are incorrect.

10. Let there be the following regression model characterizing the dependence of y on x:

y = 8 - 7x. It is also known that rxy = -0.5; n = 20. Tcr (0.05, 18) = 2

Plot the confidence interval for the regression coefficient in this model, analyze the results.

Вариант 5

1. The tabular value of the Fisher criterion depends ...

A) only on the level of confidence.

B) only on the number of factors included in the model.

C) only on the length of the original row.

D) only on the level of confidence and the number of factors included in the model.

E) and on the level of confidence, and on the number of factors included in the model and on the length of the original series.

2. (Please select multiple answers) The econometric model of the Cobb-Douglas type linearly includes

A) Variable x2; B) Variable x1; C) Variable y; D) Parameter a.

3. What is the meaning of the least squares method?

A) $\Sigma(y - \hat{y}_x)^2 \to \min$; B) $\Sigma(y- \hat{y}_x)^2 \to \max$;

C) $\Sigma(y- \hat{y}) \to \min$; D $\Sigma(y- \hat{y}) \to \max$.

4. The researcher analyzes the model $y_i = \theta x_i + \varepsilon_i$, for which all the prerequisites of the classical linear multiple regression model are satisfied with one exception: the variance of the random error εi has the form $V(\varepsilon_i) = \delta x_i^2$, δ>0. If the researcher uses the usual least squares method to estimate the coefficients of the model, then his estimates will be:

A) displaced and effective; B) biased and ineffective;

B) unbiased and effective; D) unbiased and ineffective.

5. In a multiple linear regression model with two explanatory variables

$$Y=\alpha+\beta_1 x_1+\beta_2 x_2+u \quad \text{o}$$

The estimate of the coefficient β1 by the least squares method for a given sample does not depend on:

A) the observed values of the variable x1;

B) the observed values of the variable x2;

B) the observed values of the variable Y;

D) the values of the constant term α;

E) covariance between x1 and Y.

6. Based on the series of data for variables X and Y, a regression equation is constructed:

$$\hat{y} = a_1 + a_2 x = 5 + 1{,}25x\,.$$

Which of the following is true:

A) The estimate of the coefficient a2 = 1.25 means that if the value of the variable X increases by an average of 1.25, then the value of the variable Y, all other things being equal, will increase by 1 unit.

B) The estimate of the coefficient a2 = 1.25 means that if the value of the variable Y increases by 1 unit, then the value of the variable X, all other things being equal, will increase on average by 1.25.

C) The form of the regression equation shows that the variables X and Y are linearly dependent on each other.

D) If, other things being equal, the value of the variable X doubles, then the value of the variable Y will increase by an average of 25%.

E) All statements in paragraphs. A-D are incorrect.

7. Select the correct statement.

1) Ridge, LASSO regressions work on the same principle, they introduce a penalty for too small β ^, and the elastic network method, on the contrary, introduces a penalty for too large β ^.

2) Ridge, LASSO regression and elastic net method work on the same principle, they introduce a penalty for too small β ^.

3) Ridge, LASSO regression and elastic net method work on the same principle, they introduce a penalty for too large β ^.

4) Ridge, LASSO regressions work on the same principle, they introduce a penalty for too large β ^, and the elastic network method, on the contrary, introduces a penalty for too small β ^.

8. Which of the regression equations cannot be reduced to linear form:

A. $y = \alpha_0 + \alpha_1 x_1 + \ldots + \alpha_n x_n + \varepsilon.$

B. $y = e^{\alpha 0} x_1^{\alpha 1} \cdot \ldots \cdot x_n^{\alpha_n} \cdot \varepsilon$.

C. $y = \alpha_0 + \alpha_1 / x_1 + \ldots + \alpha_n / x_n + \varepsilon$.

D. $y = \alpha_0 + \alpha_1 x_1^{\alpha 2} + \ \ldots \ + \ \varepsilon$.

E. All equations in pp. A-D can be reduced to a linear form.

9. Suppose the management decided to build a store on the street with an average frequency of 7,500 visits per day and would like to have a turnover of 4.75 million rubles. What should be the sales area in this case? Y - store turnover, million rubles, X1 - retail space, thousand square meters, X2 - average number of visitors per day, thousand people.

$\hat{y} = -0,832 + 4,743 x_1 + 0,175 x_2$.

A) 0.9 m2; B) 900 sq.m; B) 1000 sq.m; D) 549 sq.m; E) All answers in paragraphs A-D are incorrect.

10 The researcher analyzes the dependence of the consumption of a certain product on the level of income for a homogeneous group of consumers: $Y_i=\beta_1+\beta_{2*}\ln INCOME_i+\varepsilon_i$, where Yi is the consumption of a certain product (in kilograms), INCOMEi is the consumer's income (in rubles). In the course of evaluating the model based on data on 400 consumers, the following results were obtained: $\hat{Y}_i=3,0+0,8*\ln INCOME_i$, $R^2=0,95$. Give an interpretation of the coefficient at the variable:

A) with an increase in income by 1%, consumption of goods increases by 8%;

B) with an increase in income by one ruble, the consumption of goods increases by 8%;

C) with an increase in income by one ruble, the consumption of goods increases by 0.08%;

D) with an increase in income by 1%, the consumption of goods increases by 8 kg;

E) with an increase in income by 1%, the consumption of goods increases by 0.008 kg.

Вариант 6

1.In a pairwise linear regression model, when using the least squares method, the following of the following statements are true:

I. The squared correlation coefficient between the actual and theoretical values of the dependent variable in the sample is R2

II. The squared correlation coefficient between the dependent variable and the explanatory variable in the sample is R2

III. The proportion of residual (unexplained) variance of the dependent variable is R2

A) Only I; B) Only II; C) Only I and III; D) Only I and II; E) I, II and III.

2. The researcher analyzes the model $y_i = \alpha + \beta x_i + \varepsilon_i$, for which all the prerequisites of the classical linear multiple regression model are satisfied with one exception: the variance of the random error εi has the form $V(\varepsilon_i) = \sigma_0^2 x_i^2$. In this case, to obtain effective estimates of the coefficients, one should use:

A) the method of least squares; B) two-step least squares method;

C) weighted least squares method; D) the method of instrumental variables.

3. (Please select multiple answers) The matrix of paired linear correlation coefficients can be used to solve the following problems:

A) Revealing multicollinearity of variables

B) Determination of the tightness of the linear relationship between variables

C) Calculating the estimates of the parameters of the equation

D) Determining the significance of the coefficients of determination

4. The regression coefficient in the linear regression of the aggregate demand for chairs (in thousands of rubles) at the price (in thousands of rubles) turned out to be –2. It means…

A) a 1% price increase reduces the demand for chairs by 2%.

B) an increase in the price of 1 ruble reduces the demand for chairs by 2%.

C) an increase in price by 1% reduces the demand for chairs by two thousand rubles.

D) an increase in the price of 1 thousand rubles reduces the demand for chairs by two thousand rubles.

E) the resulting number is not interpreted in any way.

5. The coefficient of determination shows ...

A) The proportion of variability in the dependent variable explained by the influence of the factors included in the model.

B) The tightness of the relationship between the actual and calculated values of the resulting indicator in the base period.

C) The statistical significance of the model as a whole based on the determination of the cumulative reliability of all its coefficients.

D) The economic significance of the model as a whole.

E) None of the statements in paragraphs. A-D is not true.

6. The following formula of the production function was estimated for 39 points, in which two components of fixed capital costs are considered separately: K1 - buildings and structures, and K2 - machinery and equipment; as well as two components of labor costs: L1 - the cost of skilled labor, and L2 - the cost of unskilled labor; Y - release:

$$ln(Y)=-4,3 + 0,35ln(K_1) + 0,26ln(K_2) + 0,63ln(L_1) + 0,58ln(L_2)$$

$$(1,4) \quad (0,03) \qquad (0,05) \qquad (0,41) \qquad (0,38);$$

$R^2 =0,92; DW=1,74$ (the standard errors of the coefficients are given in parentheses).

Which of the conclusions and next steps do you think is correct?

A) It is necessary to exclude the factor L (variables L1 and L2), because he turned out to be insignificant;

B) There is multicollinearity, therefore it is necessary to combine the factors K1 and K2;

C) There is multicollinearity, therefore it is necessary to combine the factors L1 and L2;

D) The deviations of ei are autocorrelated, it is necessary to change the dependence formula;

E) The dependency formula is acceptable for all the above parameters, and no changes are needed.

7. Fisher's criterion shows ...

A) The proportion of variability in the dependent variable explained by the influence of the factors included in the model.

B) The tightness of the relationship between the actual and calculated values of the resulting indicator.

C) The statistical significance of the model as a whole based on the aggregate reliability of all its coefficients.

D) The economic significance of the model as a whole.

E) None of the statements A-D is true.

8. Confidence intervals are plotted for ...

A) Estimates of the forecast quality.

B) Checking the quality of the initial information.

C) Estimates of the likelihood of coincidence of actual and predicted values.

D) None of the answers in items A-D are correct.

9. Let Y be the turnover of the store, million rubles, X1 - retail space, thousand square meters, X2 - the average number of visitors per day, thousand people.

$\hat{y} = -0,832 + 4,743 x_1 + 0,175 x_2.$

What would be the turnover of a store if it is located in a relatively busy location with 20,000 visitors and a retail space of 1,000 square meters?

A) 8242.168 million rubles. B) 8.243 million rubles. C) 6.411 million rubles.

D) 3.911 million rubles. E) All answers in paragraphs. A-D are incorrect.

10. ABC's management decided to investigate the effectiveness of the continuing education courses sometimes offered to its employees. The study involved 200 employees of the company. Among them, 50 people were randomly selected for whom these courses were conducted, the rest of the employees participating in the study did not take advanced training courses. After that, based on the data obtained using OLS, the following regression equation was estimated (the standard errors of the coefficient estimates are indicated in parentheses):

$$\widehat{\ln y_i} = \underset{(0,4)}{2,0} + \underset{(0,1)}{0,5 x_i} + \underset{(0,1)}{0,3 z_i}, \quad R^2 = 0,8.$$

Here xi is a dummy variable that is equal to 1 for employees who have completed advanced training courses and is equal to 0 for other employees, zi is the work experience of the i-th employee, measured in years, yi is the productivity of the i-th employee. In accordance with the obtained equation, by what percentage, other things being equal, does the worker's labor productivity increase as a result of taking advanced training courses?

а) на $\left(e^2 - 1\right) * 100\%.$
б) на $e^2 * 100\%,$
в) на $\left(\sqrt{e} - 1\right) * 100\%,$
г) на $\sqrt{e} * 100\%.$

Вариант 7

1. Statistics are used to identify autocorrelation of residuals in the regression equation ...

A) Student; B) Fisher; C) Bartlett; D) Darbin-Watson.

2. Find the correct statement. When selecting factors by gradually increasing their number to include a new factor in the model, it is enough to ...

A) The absolute value of the paired correlation coefficient of the resulting indicator and the newly introduced factor was more than a certain threshold value.

B) The new factor did not correlate with those previously included in the model.

C) Items A and B were performed simultaneously.

D) The change in the coefficient of multiple determination caused by the addition of a factor was non-negative.

E) None of the statements A-D is correct.

3. Student's criterion is used in econometric modeling ...

A) Only to determine the statistical significance of each of the coefficients of the regression equation.

B) Only to determine the economic significance of each of the coefficients of the regression equation.

C) Only for calculating the confidence intervals of the coefficients of the regression equation and the predicted interval of the dependent value.

D) And to determine the statistical significance of each of the coefficients of the regression equation and to calculate the confidence intervals for the coefficients of the regression equation and the predicted interval of the dependent value.

E) None of the statements A-D is correct.

3. Benjamin examines the influence of various factors on the wages of people living in Russia. Based on 1,000 observations, he estimated the regression of wages (wagei, in thousands of rubles) from a person's education (educi, in years), education of this person's mother (mother.educi, in years), and dummy for work experience (experi: 1 - if more than 5 years, 0 - if less than 5 years). Benjamin got the following results:

4. $\widehat{wage}_i = 10 + 20 \cdot educ_i + 5 \cdot mother.educ_i + 15 \cdot exper_i$

Benjamin has concerns about multicollinearity in the data. To test his guess, he evaluated the auxiliary regressions and got:

$$\widehat{educ}_i = 11 + 2 \cdot mother.educ_i - 5 \cdot exper_i, R^2 = 0.97$$

$$\widehat{mother.educ}_i = 10 + 10 \cdot educ_i + 3 \cdot exper_i, R^2 = 0.93$$

$$\widehat{exper}_i = -8 \cdot educ_i + 9 \cdot mother.educ_i, R^2 = 0.3$$

After calculating the inflation-variance coefficients for all the auxiliary regressions, what conclusion should Benjamin draw?

A) There is multicollinearity between a person's education and his work experience, these variables are dependent among themselves, but not related to the education of the mother;

B) There is multicollinearity between the education of a mother and her child and work experience, all these variables are dependent on each other;

C) There is a multicollinearity between the education of a mother and her child, these variables are dependent among themselves, but not related to work experience;

D) There is multicollinearity between the mother's education and work experience; these variables are dependent on each other, but not related to the child's education.

5. Which of the regression equations is indicative?

A) $y = \alpha_0 + \alpha_1 x_1^{\alpha_2} + \ldots + \varepsilon$.

B) $y = e^{\alpha_0} x_1^{\alpha_1} \cdot \varepsilon$.

C) $y = \alpha_0 + \alpha_1 / x_1^2 + \ldots + \varepsilon$.

D) $y = \alpha_0 \alpha_1^{x_1} \alpha_2^{x_2} \cdot \varepsilon$.

E) $y = \alpha_0 + \alpha_1 x_1^{\alpha_2} + \varepsilon$.

5. Pulcheria estimated the model of dependence of lag.quarterly.revenuet revenue on price.indext price index and income.levelt income based on 39 observations and obtained

$\widehat{lag.quarterly.revenue_t} = 8.892 - 1.392 \cdot price.index_t + 1.101 \cdot income.level_t$

Assumption: $\varepsilon_t = \gamma_1 \cdot \varepsilon_{t-1} + \gamma_2 \cdot \varepsilon_{t-2} + u_t$

Pulcheria wants to conduct a Brousch-Godfrey test for autocorrelation. She estimated the auxiliary regression $\hat{\varepsilon}_t$ on price.indext, ncome.levelt, $\hat{\varepsilon}_{t-1}$ and $\hat{\varepsilon}_{t-2}$ and got $Raux^2 = 0.15$.

What is the observed value of the test statistic received by Pulcheria? Enter a number with two decimal places.

7. (Please select more than one answer) The coefficient of determination was 0.9, therefore ...

A) 90% of the variance of the effective trait is explained by the regression equation

B) the share of the residual variance of the dependent variable y in its total variance was 90%

C) the share of the residual variance of the dependent variable y in its total variance was 10%

D) the regression equation explains 10% of the variance of the effective trait

8. The coefficient of elasticity shows ...

A) how many units. the factor will change when the result changes by 1 unit.

B) how many units. the result will change when the factor changes by 1 unit.

C) how many times the result will change when the factor changes by 1 unit.

D) by how many% the result will change when the factor changes by 1%.

E) by how many% the factor will change when the result changes by 1%.

9) The management of ABC decided to investigate the effectiveness of the refresher courses that are sometimes given to its employees. The study involved 200 employees of the company. Among them, 50 people were randomly selected for whom these courses were conducted, the rest of the employees participating in the study did not take advanced training courses. After that, based on the data obtained using OLS, the following regression equation was estimated (the standard errors of the coefficient estimates are indicated in parentheses):

$$\widehat{\ln y_i} = \underset{(0,2)}{0,5} + \underset{(0,3)}{2,0}\, x_i + \underset{(0,4)}{0,4}\, z_i, \quad R^2 = 0,9.$$

Here xi is a dummy variable that is equal to 1 for employees who have completed advanced training courses and is equal to 0 for other employees, zi is the work experience of the i-th employee, measured in years, yi is the productivity of the i-th employee. In accordance with the obtained equation, by what percentage, other things being equal, does the worker's labor productivity increase as a result of taking advanced training courses?

а) на $\left(e^2 - 1\right) * 100\%$.
б) на $e^2 * 100\%$,
в) на $\left(\sqrt{e} - 1\right) * 100\%$,
г) на $\sqrt{e} * 100\%$.

10. The researcher obtained the following results of estimating the parameters of a linear multiple regression model using the least squares method based on data from 200 observations:

$$\hat{y}_i = \underset{(0,1)}{-0,6} + \underset{(100,0)}{800,0}\, x_i + \underset{(2,4)}{9,9}\, z_i.$$

Corresponding standard errors are indicated in parentheses under the coefficient estimates. Plot the 95 percent confidence interval for the coefficient of the variable xi. (The corresponding critical t-statistic at the 5% significance level is 1.96.)

A) (700, 900)

B) (798.04, 801.96)

B) (408, 1192)

D) (604, 996).

Вариант 8

1. The random component in the econometric model ...

A) applies only to linear models.

B) does not make economic sense.

C) reflects the influence of random factors on the effective sign.

D) is a negligible value that can be neglected.

2. Which of the following tasks does it make sense to solve using linear regression? Attention: Choose two correct answers!

A) Assessment of the influence of a person's income on his spending on the purchase of sweets;

B) Estimation of the probability of a large meteorite falling to the Earth;

C) Forecasting the salary of a university graduate;

D) Establishing causal relationships between education and human life expectancy.

3. How is the regression coefficient b0 interpreted in a linear model?

A) coefficient of elasticity;

B) the tangent of the regression slope;

C) the value of the effective trait at a zero value of the factor.

3. Benjamin examines the influence of various factors on the wages of people living in Russia. Based on 350 observations, he estimated the regression of wages (wagei, in thousands of rubles) from a person's education (educi, in years), education of this person's mother (mother.educi, in years) and dummy for work experience (experi: 1 - if more than 5 years, 0 - if less than 5 years). Benjamin got the following results:

$\widehat{wage}_i = 10 + 20 \cdot educ_i + 5 \cdot mother.educ_i + 15 \cdot exper_i$

Benjamin has concerns about heteroscedasticity in the data. To test his guess, he wants to run White's test at the 5% significance level. Benjamin estimated the auxiliary regression and got Raux2 = 0.55.

What conclusion will Benjamin make?
A) At the 5% significance level, the null hypothesis is not rejected, there is a conditional homoscedasticity in the data;
B) At the 5% significance level, the null hypothesis is rejected, the data contains conditional homoscedasticity;
C) At the 5% significance level, the null hypothesis is rejected, the data contains conditional heteroscedasticity;
D) At the 5% significance level, the null hypothesis is not rejected, the data contains conditional heteroscedasticity.

5. The statistical significance of the model as a whole means that
A) For the reference period, the calculated values of the resulting indicator are closer to its true values than its arithmetic mean in this period.
B) The difference between the calculated and actual values of the resulting indicator for all points of the base period does not exceed some predetermined value □.
C) The difference between the calculated and actual values of the resulting indicator, taken in absolute value, for all points of the base period does not exceed some predetermined value □.
D) The sum of the squares of the errors does not exceed some predetermined value □.
E) None of the statements A-D is true.

6. Consider a regression model with a stochastic regressor $y_i=\beta_1+\beta_2 x_i+\varepsilon_i$. To obtain an estimate of the coefficient of the model, two-step OLS is used, where the variable z is used as a tool for the variable x.

We have the following data on two thousand observations at our disposal:

$$\sum x_i = 2000, \sum y_i = 2000, \sum z_i = 2000$$

$$\sum x_i^2 = 6000, \sum x_i y_i = 6000, \sum y_i z_i = 6000, \sum x_i z_i = 3000$$

Find the estimate for the parameter β1.
A) 1; B) 4; B) 0.25; D) 0; D) -3.

7. (Please select more than one answer) The coefficient of determination was 0.9, therefore ...
A) 90% of the variance of the effective trait is explained by the regression equation.
B) the share of the residual variance of the dependent variable y in its total variance was 90%.
C) the share of the residual variance of the dependent variable y in its total variance was 10%.
D) the regression equation explains 10% of the variance of the effective trait.

7. Conditional homoscedasticity is:
A) $E(\varepsilon_i | \text{все регрессоры}) = \sigma^2$;
B) $E(\varepsilon_i^2 | \text{все регрессоры}) = \sigma^2$;
C) $E(\varepsilon_i^2 | \text{все регрессоры}) = \sigma$;

D) $E(\varepsilon_i|\text{все регрессоры}) = \sigma$.

9. Find the correct statement. Elasticity shows ...

A) by how many units will the factor xk change when the resulting indicator y changes by 1 unit.

B) by how many units will the resulting indicator y change when the factor xk changes by 1 unit.

C) by how many% will the factor xk change when the resulting index y changes by 1%.

D) by how many% the resulting index y will change when the factor xk changes by 1%.

E) all statements in paragraphs. A-D are incorrect.

10. Based on 100 observations, Benjamin estimated the dependence of the number of econometrics problems (problems) solved by him in the evening on the number of buns with apples (applepie) and meat (meatpie) eaten:

$$\widehat{problems}_i = 2 + 0.5 \cdot applepie_i + 0.7 \cdot meatpie_i$$

The standard errors of the coefficients for (applepie) and (meatpie) are 0.1 and 0.5, respectively.

Plot the 90% confidence interval for the coefficient at applepiei and specify its left border to two decimal places after the dot.

Вариант 9

1. The coefficient of elasticity shows ...

A) how many units. the factor will change when the result changes by 1 unit.

B) how many units. the result will change when the factor changes by 1 unit.

C) how many times the result will change when the factor changes by 1 unit.

D) by how many% the result will change when the factor changes by 1%.

E) by how many% the factor will change when the result changes by 1%.

2. Benjamin tries to understand whether heteroscedasticity is as terrible as it is painted :) If Benjamin has a finite sample of observations and Benjamin does not make the assumption that εi has a normal distribution, then what are the consequences if the data contains heteroscedasticity?

1) OLS estimates have all the same properties as in the case of homoscedasticity;

2) OLS estimates are no longer the most efficient among linear unbiased;

3) OLS estimates are no longer unbiased;

4) OLS estimates are no longer linear.

3. Find the correct statement. When selecting factors by gradually reducing their number, the following are applied:

A) Fisher's, Student's, Durbin-Watson's criteria, multiple determination coefficient.

B) Coefficients of paired and multiple correlation of the resulting indicator and factors, Fisher's and Student's tests.

C) Coefficients of paired and multiple correlation of the resulting indicator and factors, the Darbin-Watson, Fisher and Student tests.

D) Durbin-Watson, Student's criteria, multiple correlation and determination coefficients.

E) Fisher's, Student's criteria, multiple correlation and determination coefficients.

4. The researcher obtained the following results of estimating the parameters of a linear multiple regression model using the least squares method based on data from 400 observations:

$$\hat{y}_i = \underset{(10,4)}{232,6} + \underset{(200,0)}{600,0}\, x_i - \underset{(2,8)}{7,5}\, z_i$$

Corresponding standard errors are indicated in parentheses under the coefficient estimates. Plot the 95 percent confidence interval for the coefficient of the variable xi. (The corresponding critical t-statistic at the 5% significance level is 1.96.)

A) (400, 800)

B) (598.04, 601.96)

B) (208, 992)

D) (404, 796).

5. For two types of products B and C, the model of the dependence of specific fixed costs on the volume of output looks as follows:$y_B = 80 + 0,7x$

$y_C = 40x^{0,5}$

Compare at x = 1000 the cost elasticities for products B and C. Draw a conclusion.

6. Based on the series of data for variables X and Y, a regression equation is constructed:
$\hat{y} = a_1 + a_2 x = 5 + 1,25x$.
Which of the following is true:

A) The estimate of the coefficient a2 = 1.25 means that if the value of the variable X increases by an average of 1.25, then the value of the variable Y, all other things being equal, will increase by 1 unit.

B) The estimate of the coefficient a2 = 1.25 means that if the value of the variable Y increases by 1 unit, then the value of the variable X, all other things being equal, will increase by an average of 1.25.

C) The form of the regression equation shows that the variables X and Y are linearly dependent on each other.

D) If, other things being equal, the value of the variable X doubles, then the value of the variable Y will increase by an average of 25%.

E) All statements in paragraphs. A-D are incorrect.

7. There are data on 150 applicants who passed the entrance exam for a master's degree at a certain faculty of economics: Y - the number of points for the entrance exam in economic theory;

D is a dummy variable equal to one if the relevant applicant attended preparatory courses for applicants, and equal to zero

otherwise; EF is a dummy variable equal to one if the respective applicant is a graduate of a bachelor's degree from a given Faculty of Economics, and equal to zero otherwise.

Using these data, the researcher estimated the parameters of the linear regression model:

$$\widehat{Y_i} = \underset{(0,1)}{20} + \underset{(4,5)}{30}\, EF_i - \underset{(1,3)}{10}\, D_i + \underset{(1,4)}{15}\, D_i \cdot EF_i$$

In accordance with the results obtained, determine the average number of points received by an applicant who graduated from a bachelor's degree in this Faculty of Economics and attended courses? (if your answer is a decimal fraction, then use a period, not a comma, as the decimal separator; for example, it is correct to write 0.1, not 0.1)

7. For two types of products B and C, the model of the dependence of specific fixed costs on the volume of products is as follows:
yB = 80 + 0,7x yC = $40x^{0,5}$

Determine the coefficients of elasticity for each type of product and explain their meaning.

9. ABC's management decided to investigate the effectiveness of the continuing education courses sometimes offered to its employees. The study involved 200 employees of the company. Among them, 50 people were randomly selected for whom these courses were conducted, the rest of the employees participating in the study did not take advanced training courses. After that, based on the data obtained using OLS, the following regression equation was estimated (the standard errors of the coefficient estimates are indicated in parentheses):

$$\widehat{\ln y_i} = \underset{(0,2)}{0,5} + \underset{(0,3)}{2,0}\, x_i + \underset{(0,4)}{0,4}\, z_i, \quad R^2 = 0,9.$$

Here xi is a dummy variable that is equal to 1 for employees who have completed advanced training courses and is equal to 0 for other employees, zi is the work experience of the i-th employee, measured in years, yi is the productivity of the i-th employee. In accordance with the obtained equation, by what percentage, other things being equal, does the worker's labor productivity increase as a result of taking advanced training courses?

а) на $\left(e^2 - 1\right) * 100\%$.
б) на $e^2 * 100\%$,
в) на $\left(\sqrt{e} - 1\right) * 100\%$,
г) на $\sqrt{e} * 100\%$.

10. Pulcheria estimated the model of dependence of lag.quarterly.revenuet revenue on price.indext price index and income.levelt income based on 39 observations and obtained

$\widehat{lag.quarterly.revenue_t} = 8.892 - 1.392 \cdot price.index_t + 1.101 \cdot income.level_t$

Assumption: $\varepsilon_t = \gamma_1 \cdot \varepsilon_{t-1} + \gamma_2 \cdot \varepsilon_{t-2} + u_t$

Pulcheria wants to conduct a Brousch-Godfrey test for autocorrelation. She estimated the auxiliary regression $\varepsilon\hat{}_t$ on price.indext, ncome.levelt, $\varepsilon\hat{}_{t-1}$ and $\varepsilon\hat{}_{t-2}$ and got $Raux^2 = 0.15$.

What is the observed value of the test statistic received by Pulcheria? Enter a number with two decimal places.

What is the observed value of the test statistic received by Pulcheria? Enter a number with two decimal places.

Вариант 10

1. The score that Benjamin will receive for his test on probability theory is a discrete random variable that can be 4, 7, and 8 (out of 10) with probabilities 0.1, 0.4, and 0.5.

What is the expected value of Benjamin's score?

A) 7.9;

B) 4.8;

C) 7.2;

D) 6.4.

2. The value of the multiple correlation coefficient is in the segment

A) [0, 1] C) [-1, 0] B) [-1, 1] D) [-2, 2]

3. What is the consequence of endogeneity?

A) It leads to heteroscedasticity of the estimates obtained by the OLS method.

B) It leads to the inconsistency of the estimates obtained by the least squares method.

C) It leads to multicollinearity of the estimates obtained by the least squares method.

D) It leads to the consistency of the estimates obtained by the least squares method.

4. Find the correct statement. Elasticity shows ...

A) by how many units will the factor xk change when the resulting indicator y changes by 1 unit.

B) by how many units will the resulting indicator y change when the factor xk changes by 1 unit.

C) by how many% will the factor xk change when the resulting index y changes by 1%.

D) by how many% the resulting index y will change when the factor xk changes by 1%.

E) All statements in paragraphs. A-D are incorrect.

5. The following data are available for 100 observations of the variables x (2), x (3), and y:

$$\sum y_i = 200, \quad \sum x_i^{(2)} = 0, \quad \sum x_i^{(3)} = 0, \quad \sum x_i^{(2)} y_i = 300,$$
$$\sum \left(x_i^{(2)}\right)^2 = 100, \quad \sum \left(x_i^{(3)}\right)^2 = 200, \quad \sum x_i^{(2)} x_i^{(3)} = 100, \quad \sum x_i^{(3)} y_i = 200.$$

Вычислите МНК-оценку коэффициента β_2 в регрессии $y_i = \beta_1 + \beta_2 x_i^{(2)} + \beta_3 x_i^{(3)} + \varepsilon_i$.

A) 10; B) 12; C) 14; D) 16.

6. The following data is available:

$$\sum_{i=1}^{20} x_i = 20, \sum_{i=1}^{20} x_i^2 = 60, \sum_{i=1}^{20} y_i = 42, \sum_{i=1}^{20} y_i^2 = 108, \sum_{i=1}^{20} e_i^2 = 300$$

The researcher estimates a model of the form yi = α + β· xi + εi. The standard error in estimating the coefficient α will be:

A) 16.67; B) 1.25; B) 1.12; D) 0.64.

7. As a result of testing the hypothesis, it may turn out that

A) The alternative hypothesis is rejected;

B) The null hypothesis is accepted;

C) The null hypothesis is not rejected;

D) Both hypotheses are rejected: the null and the alternative.

8. Within the framework of the premises of the classical linear multiple regression model, the researcher analyzes the model:

$$y_i = \beta_1 + \beta_2 * x_i + \beta_3 * z_i + \varepsilon_i.$$

After collecting data from 500 observations, he estimated the parameters of the model using the method of least squares:

$$\hat{y}_i = \underset{(0,12)}{0,21} + \underset{(1,95)}{6,72} x_i + \underset{(0,94)}{0,81} z_i$$

Corresponding standard errors are indicated in parentheses under the coefficient estimates. Check the hypothesis β3 = 1. (The corresponding critical value of the t-statistic at the 5% significance level is 1.96, and at the 1% significance level is 2.58.)

A) The tested hypothesis is not rejected at both the 1% significance level and the 5% significance level.

B) The hypothesis being tested is not accepted both at the 1% significance level and at the 5% significance level.

C) The hypothesis being tested is not rejected at the 1% significance level and is not accepted at the 5% significance level.

D) The hypothesis being tested is not rejected at the 5% significance level and is not accepted at the 1% significance level.

9. Suppose the management decided to build a store on the street with an average frequency of 7,500 visits per day and would like to have a turnover of 4.75 million rubles. What should be the sales area in this case? Y - store turnover, million rubles, X1 - retail space, thousand square meters, X2 - average number of visitors per day, thousand people. $\hat{y} = -0,832 + 4,743 x_1 + 0,175 x_2$.

A) 0.9 m2; B) 900 sq.m; B) 1000 sq.m; D) 549 sq.m; E) All answers in paragraphs. A-D are incorrect.

10. The Keynesian country is a closed economy without direct government intervention, therefore, the main macroeconomic identity in it is as follows: $Y_t = C_t + I_t$,

where Yt is GDP in month t, Ct is total consumption in month t, and It is investment in month t.

Consumption depends on income as follows:

$$C_t = C_a + mpc \cdot Y_t + \varepsilon_t,$$

where εt are random consumption shocks, which are independent identically distributed random variables with zero mathematical expectation and constant variance; random consumption shocks are not correlated with investments. There are no structural shifts in Keynesianism, so autonomous consumption and marginal propensity to consume are unchanged.

You know the above facts about the Keynesian economy, and you also have monthly data on the dynamics of consumption, investment and GDP in this country over the past 100 years. You are wondering what is the marginal propensity to consume in Keynesian countries.

Your assistant has performed preliminary calculations and calculated the sample covariance and variance for the variables at your disposal: Cov (Ct; Yt) = 150, Var (Ct) = 100, Var (Yt) = 300.

The econometrician John Inconsistent, with the same information as you, also decided to obtain an estimate of the marginal propensity to consume. Using the usual OLS, he estimates the consumption-income regression. Calculate the grade that John will get.

A) 0.5; B) 1.5; C) 3; D) 0.33.

Критерии оценивания:

Максимальное количество баллов – 10.

Из имеющегося банка тестов формируется тестовое задание, содержащее 10 тестов. Каждый тест содержит 3-4 варианта ответов, один или несколько из которых – верный. Правильный ответ на каждый тест оценивается в 1 балл, неправильный – 0 баллов.

Кейс- Problem

Tasks.

1. Form a statistical database on the following variables: return of a risk-free asset, market profitability and return of five assets selected students individually and related to different types of economic activity (for example, information source – MMVB).

2. Perform a descriptive analysis of the available data. Draw conclusions.

3. Build the models to describe and predict the return of selected assets. The last five observations used as the exam sample. Draw conclusions.

4. Build the models for risk of investment in selected assets. Draw conclusions.

5. The results are issued in the form of an explanatory note.

Instruction and / or methodological recommendations for implementation

As information, use the statistics available on the Internet.

Models should be building using any application software package - Eviews, Excel, SPSS, etc. without restriction.

Критерии оценки:

Максимальное количество баллов - 10

5-10 баллов выставляется, если:

- все задания выполнены полностью, в представленном решении обоснованно получены правильные ответы, проведен анализ, дана грамотная интерпретация полученных результатов, сделаны выводы; пояснительная записка грамотно написана и оформлена, отсутствуют орфографические, синтаксические и стилистические ошибки; во время обсуждения показаны знания темы, даются уверенные ответы на поставленные вопросы;
- задания выполнены полностью, но при анализе и интерпретации полученных результатов допущены незначительные ошибки, выводы – достаточно обоснованы, но неполны; пояснительная записка грамотно написана и оформлена, допускаются незначительные орфографические; синтаксические и стилистические ошибки; во время обсуждения показаны знания темы, даются достаточно уверенные ответы на поставленные вопросы; допускаются незначительные логические ошибки.
- задания выполнены частично, анализ и интерпретация полученных результатов не вполне верны, выводы верны частично; пояснительная записка достаточно грамотно написана и оформлена, допускаются незначительные орфографические; синтаксические и стилистические ошибки; во время обсуждения показаны знания темы, ответы на поставленные вопросы ответы изложены с отдельными ошибками, уверенно исправленными после дополнительных вопросов.

0-4,9 балла выставляется, если:

- решение неверно или отсутствует; отсутствуют выводы; допущены фактические ошибки в содержании пояснительной записки или при ответе на дополнительные вопросы; обнаруживается существенное непонимание проблемы.

Вопросы для коллоквиумов, собеседования

1. The linear regression model and its specification. Discrete choice models.

1. Multiple linear regression model.
2. Ordinary least-squares method (OLS)
3. Extended least squares method (ELS).
4. Dummy variables..
5. Restricted least squares.
6. The maximum-likelihood method.
7. Multicollinearity and elimination methods.
8. Specification errors and their detection.
9. Choosing the optimal set of regressors and functional forms of the regression dependence
10. Heteroskedasticity, its causes and methods of detection and elimination. *Weighted least squares* (WLS).
11. Residual autocorrelation, its causes, detected and elimination methods.
12. Endogeneity of variables. The case of correlated regressors and random error.
13. Errors of measurement variables. Instrumental variables. The Hausman test..
14. Discrete dependent variables: nominal, ranked and quantitative. Binary choice models. Probit and Logit models.
15. Interpretation of coefficients in binary choice models. The maximum-likelihood method in Probit and Logit models. Goodness-of-fit testing for models.

2. Time series and Panel data models

16. Box-Jenkins models.
17. Distributed lag models (partial adjustment model, adaptive expectations model).
18. The Granger causality test.
19. Imaginary regression.
20. The unit root.
21. Unit root tests.
22. Cointegration of time series.
23. Error correction model.
24. Advantages of using panel data.
25. Difficulties in working with panel data.
26. Error components model.
27. Model specification. Fixed and random individual effects.
28. Operators «Between» and «Within».
29. Types of estimates.
30. Comparative analysis of estimates.
31. Specification tests for panel data models.
32. The Hausman test.
33. Testing random effects.
34. Testing fixed effects.

Критерии оценивания:

Максимальный балл – 10.

Число вопросов - 10. Ответ на каждый вопрос оценивается максимум в 1 балл.

Критерии оценивания 1 вопроса:

0,5-1,0 балла выставляется студенту, если:

- изложенный материал фактически верен, продемонстрированы глубокие исчерпывающие знания в объеме пройденной программы в соответствии с поставленными программой курса целями и Problemми обучения, изложение материала при ответе - грамотное и логически стройное;

- продемонстрированы твердые и достаточно полные знания в объеме пройденной программы дисциплины в соответствии с целями обучения; материал изложен достаточно полно с отдельными логическими и стилистическими погрешностями;

- продемонстрированы твердые знания в объеме пройденного курса в соответствие с целями обучения, ответ содержит отдельные ошибки, уверенно исправленные после дополнительных вопросов;

0-0,49 балла выставляется студенту, если ответ не связан с вопросом, допущены грубые ошибки в ответе, продемонстрированы непонимание сущности излагаемого вопроса, неуверенность и неточность ответов на дополнительные и наводящие вопросы.

Комплект разноуровневых задач (заданий)

Tasks of reproductive level

1. Consider the binary choice models

2. $$y=\begin{cases}1,\ y^*=\alpha+\beta x+\varepsilon\geq 0\\ 0,\ y^*=\alpha+\beta x+\varepsilon<0\end{cases}$$

$y \setminus x$	0	1
0	n_{00}	n_{01}
1	n_{10}	n_{11}

a) Prove that the model can not be solved if n_{10}=0 for any error distribution function $\mathrm{F}_{\varepsilon}(z)$: $\mathrm{f}_{\varepsilon}(\mathrm{z})>0$

b) Estimate the coefficients of logit-model $\mathrm{P}(y=1)=\Lambda(\alpha+\beta x)$

c) Prove that for the logit-model $\overline{\hat{\mathrm{P}}(\mathrm{y}=1)}=\dfrac{n_{10}+n_{11}}{n_{10}+n_{11}+n_{01}+n_{00}}$

d) Estimate *LP*-model (ε~Uniform[-1, 1]). What is $\overline{\hat{\mathrm{P}}(\mathrm{y}=1)}$

e) Suppose you have estimated probit-model and have found that its coefficients are proportional to the coefficients of LP-model (ε ~ Uniform [-1, 1]). What approximately the proportionality coefficient should be equal?

3. Consider *tobit*-model: $y=\begin{cases}\alpha_1,\ y^*\leq\alpha_1\\ y^*,\ \alpha_1<y^*<\alpha_2,\ y^*=\mathbf{x}\boldsymbol{\beta}+\varepsilon,\\ \alpha_2,\ y^*\geq\alpha_2\end{cases}$

where mistakes have distribution density f(z)

a) Find the distribution *y*

b) Find the log-likelihood function for estimating the vector **β**

c) Find $\frac{\partial \mathrm{E}\, y}{\partial x}$

4. Which of the following processes are stationary:

а) $y_t = 10\varepsilon_t - 99\varepsilon_{t-1}, \quad \varepsilon_t \sim i.i.d.(0,\sigma^2)$

б) $y_t = 2{,}5 + 0{,}6y_{t-1} + 0{,}45y_{t-2} + \varepsilon_t, \quad \varepsilon_t \sim i.i.d.(0,\sigma^2)$

в) $y_t = \varepsilon_t\varepsilon_{t-1}, \quad \varepsilon_t \sim i.i.d.(0,\sigma^2)$

г) $y_t = \sin\left(\frac{t}{2}\pi\right) + \varepsilon_t, \quad \varepsilon_t \sim i.i.d.(0,\sigma^2)$

д) $y_t = z + \varepsilon_t, \quad \varepsilon_t, z \sim i.i.d.(0,\sigma^2)$

5. Find a forecast for an arbitrary number of steps ahead and the variance of the forecast error for ARMA(1,1) of the process

$y_t = \delta + \alpha y_{t-1} + \varepsilon_t - \theta_1\varepsilon_{t-1}, \quad \varepsilon_t \sim i.i.d.\ N(0,\sigma^2)$.

6. Find the unconditional variance and autocorrelation function for the process of the previous problem.

7. For Box-Ljung test for autocorrelation in ARMA (p,q) model write down the null hypothesis, the test statistics and its distribution when the null hypothesis.

8. For the given below regression equation specify the null hypothesis of a unit root in the process x_t:

$x_t = \mu + \delta t + \rho x_{t-1} + \phi_1\Delta x_{t-1} + \Lambda + \phi_k\Delta x_{t-k} + \varepsilon_t$.

Explain the purpose of each regressor in equation.

Tasks of reconstructive level

9. Consider the problem of identifiability of each of the equations in the following model:

$$\begin{cases} P_t + \beta_{12}W_t + \gamma_{11}Q_t + \gamma_{13}P_{t-1} = \varepsilon_{1t}, \\ \beta_{21}P_t + W_t + \beta_{23}N_t + \gamma_{22}S_t + \gamma_{24}W_{t-1} = \varepsilon_{2t}, \\ \beta_{32}W_t + N_t + \gamma_{32}S_t + \gamma_{33}P_{t-1} + \gamma_{34}W_{t-1} = \varepsilon_{3t}, \end{cases}$$

where P_t, W_t, N_t – price index, wages and trade union fee, respectively (endogenous variables), а Q_t и S_t – productivity and the number of strikes (exogenous variables). What are ordinal and rank conditions, if you know that:

а) $\gamma_{11} = 0$,

б) $\beta_{21} = \gamma_{22} = 0$,

в) $\gamma_{33} = 0$?

10. Consider the following system of equations:

$$\begin{cases} y_{1t} = \gamma_{10} + \beta_{12}y_{2t} + \beta_{13}y_{3t} + \gamma_{11}x_{1t} + \gamma_{12}x_{2t} + \varepsilon_{1t}, \\ y_{2t} = \gamma_{20} + \beta_{21}y_{1t} + \gamma_{21}x_{1t} + \varepsilon_{2t}, \\ y_{3t} = \gamma_{30} + \beta_{31}y_{1t} + \beta_{32}y_{2t} + \gamma_{31}x_{1t} + \gamma_{33}x_{3t} + \varepsilon_{3t}. \end{cases}$$

Is each of system equations identifiable? What will you obtain when you apply to the first equation of the two-step method of least squares?

Критерии оценивания:

Максимальный балл -5

Каждая Problem оценивается максимум в 1 балл. Критерии оценивания 1 задачи:

0,5-1 балл. Problem решена в полном объеме, выбраны верные инструментальные методы и приемы решения, проведены верные расчеты, сделан полный, содержательный вывод по результатам проведенных расчетов; либо Problem решена в полном объеме с небольшими погрешностями, выбраны верные инструментальные методы и приемы решения, проведены верные расчеты, сделан полный, содержательный вывод по результатам проведенных расчетов, в расчетах и выводах содержатся незначительные ошибки.

0-0,4 балла. Problem решена частично, частично выбраны верные инструментальные методы и приемы решения, проведены частичные расчеты, сделан вывод по результатам проведенных расчетов с погрешностями; либо Problem не решена или решена частично, частично выбраны необходимые инструментальные методы и приемы решения, расчеты не проведены или проведены частично, вывод по результатам проведенных расчетов не сделан или ошибочен.

Задания к лабораторным работам

Laboratory work 1. Estimation of discrete choice regression models.

Exercise 1: Reviewing the Evidence

a) Using the data from Mroz, calculate the expectation and the standard deviation, minimum and maximum for all 19 variables. Comment on the results.

b) Run a) separately for working women (428 cases) and not working (325 observations). Comment on the results. Do subsamples differ in the variables WA, WE, K618, HA, HE, HHRS? What about the descriptive statistics for the explanatory variables on KL6 and HW? Interpret the difference in AX.

c) Construct a variable PRIN unearned income by rule PRIN=FAMINC–(WHRS·WW). Calculate descriptive statistics.

d) For the subsample of 428 women employed to compute the value of a new variable LWW = LN (WW). For the entire sample, build variables AX2 = AX · AX, WA2 = WA · WA. Construct Mincer regression model by constant, WA, WE, CIT, AX and AX2 only for working women. Comment on the results. Using the estimates of the regression parameters, calculate the predicted values of the logarithm of wages for unemployed women, and name the variable FLWW. Compare the average values of the variables LWW and FLWW. Interpret the results. Create a new variable LWW1, LWW equal to employees, and equal FLWW for not working. Calculate the mean and standard deviation You should get 1.10432 and 0.58268 respectively.

Exercise 2: Evaluation of labor supply equation (procedure I)

a) Check that the WHRS = 0, = 0 when the LFP. Build OLS regression for the whole sample WHRS the constant WHRS KL6, K618, WA, WE, LWW1 and PRIN. The signs of the coefficients correspond to economic theory? If not - why? What is R^2? Why is it not enough?

b)The effect of uncompensated wage by the number of hours of work by Mroz can be calculated as $\partial H_i/\partial W_i=a_1/W_i$ and the income effect - as $\partial H_i/\partial V_i=a_2$. Appropriate elasticity calculated as $\partial \ln H_i/\partial \ln W_i=a_1/H_i$ and $\partial \ln H_i/\partial \ln V_i=a_2 V_i/H_i$, where a_1 and a_2 – regression coefficients for the variables $\ln W_i$ and V_i respectively. Calculate the elasticity of supply hours for the regression a) of wages and unearned income. Elasticity of of wages compensated or not? Why? Calculate the effect of uncompensated wage by the number of hours of work and the income effect on Mroz. Give an interpretation of the results.

c) Explain principal flaws of used in a) labor supply estimation procedure.

Laboratory work 2. Time series models.

There are data (Rosstat's information) of the monthly dynamics of electricity production in the Russian Federation in billions of kilowatt-hours. Perform analysis of the component composition of the time series of electricity production; build trend-seasonal model of energy production and obtain predictive estimate of electricity production in the first quarter of 2002 using the resulting model.

MONTH	1998	1999	2000	2001
JANUARY	86,6	84,7	88,9	90,6
FEBRUARY	79	76,5	81,6	82,2
MARCH	79,5	81,3	81,9	83,3
APRIL	70	67,8	68,4	71,3
MAY	59,6	62,3	65,2	64,7
JUNE	54,2	56,1	57,7	59,1
JULY	52,7	55,8	58,7	60,1
AUGUST	52,9	58,2	60,4	61,7
SEPTEMBER	57,6	63,3	64,5	64,4
OCTOBER	70,5	71,8	76,9	78,5
NOVEMBER	78,4	80,8	83,4	82,5
DECEMBER	85,7	87,5	90,2	92,8

Laboratory work 3. Stationarity of time series.

Tasks and exercises.

1. You use the Dickey-Fuller test of time series nonstationarity with the number of observations of 100. Evaluate the model that does not include the constant and time trend, and get the value of the statistics of 0.90, for the model with a constant and a time trend, get the value of the statistics -0.2. What are your conclusions?
2. There is a model $Y_t = 0,5 + 0,5Y_{t-2} + Z_t$, where Z_t - white noise. What is the average level of the series Y_t?
3. Perform a test for stationarity of the time series:
   a) problem 1 of Chapter 6.
   b) problem 2 of Chapter 6.
4. Process is given $y_t = 0,8y_{t-1} + 0,2y_{t-2} + \varepsilon_t - 0,9\varepsilon_{t-1}$. At what value of k will the series $\Delta^k y_t$ be stationary?
5. Generate in Eviews a time series that obeys first-order autoregression with a coefficient of 0.99. Check the series for stationarity using various tests.

Laboratory work 4. Time series causation

1. For the available data (data file Keynes.wf1 [https://cloud.mail.ru/public/5Apk/S12u6DKX8]) on consumer spending C and income Y in the United States in billions of dollars, adjusted for seasonality, draw a consumption graph and income. What can you say about these series in the graphs?

2. Create the first differences of the logarithms for both series. Draw a graph and draw conclusions.

3. Build models with consumption (model 1) and income (model 2) as the dependent variable.

4. Estimate the parameters of the structural form of the model using OLS according to the initial data. Then do the same using the transformed log difference data. Explain if the two sets of scores obtained have the same meaning. Which ratings are preferable and why?

5. Rewrite the model in the given form. Indicate the relationship between the coefficients of the structural and reduced forms. Estimate the reduced form of the model from the original data and from the transformed data. Which ratings are preferable and why?

6. Add one more lag to both equations of the reduced form. Estimate the coefficients from the original data and from the transformed data, and run Granger causality tests. What can be said about the direction of causality from the results obtained?

7. Check the series for unit roots using the Dickey-Fuller test.

8. Apply the Johansen method to the original data and to the logarithms of the original data, using 4 lags of differences in the model.

Laboratory work 5. Panel data models.

File rlms578 contains observations on 5029 individuals in 1994, 1996 and 1998 in Russia - panel data. You can get a description of each of the variables by using the describe command in Stata. Numbers 5, 7 and 8 in the variable names correspond to 1994, 1996 and 1998 years respectively.

Exercise 1.

a) Get to know the content of the file rlms 578. Look at the description of the variables and their descriptive statistics.

b) File rlms578 contains data in a short format: the value of each variable is given for each year. To use the data necessary to convert data to a long format. Make this conversion by using idind as an identifier individuals and year as time identifier.

c) Estimate standard Mincer equation for cash incomes lnwg included as regressors iexp iexpsq iedu imale. Comment on the result. Estimate the regression of this type for each year (in the spatial data). Compare the results for different years with each other and across the panel estimations in general. Make conclusions.

d) Examine the impact of education on monetary incomes, using dummy variables for each level of education. Comment on the results. Give an interpretation of the coefficients. what the level of education has the most impact? Why?

e) Assess the impact of urbanization, and region of residence of the individual tested the extended Mincer equation. Include additional variables urban metro nwest central volga ncaucas ural wsiber and using the random effects model.

f) Use the random effects, fixed effects in regression lnwg on iexp iexpsq iedu imale. Which model is a priori more appropriate? Why? Use the Hausman test for testing the model specification. What result do you get? It is consistent with your expectations? Comment on the results of the model chosen. Compare the best model with the estimates obtained by OLS between.

Exercise 2.

a) Construct an equation for determining the probability of marital status. It is recommended to use the probit model with random effects. Select the model specification yourself. Give full meaningful interpretation of this equation.

b) Construct Tobit model for the logarithm of hours (censoring point must be selected lnhr = 3). Select the model specification yourself. Give full meaningful interpretation of this equation.

Критерии оценивания:

Максимальная оценка – 65 баллов.

Задание к лабораторной работе №1

Максимальная оценка -5 баллов

2,5 – 5,0 баллов выставляется, если обучающийся:

- выполнил работу в полном объеме с соблюдением необходимой последовательности; самостоятельно и рационально выбрал спецификации моделей; грамотно оформил представленный отчет;

- выполнил работу в полном объеме с соблюдением необходимой последовательности; самостоятельно и рационально выбрал спецификации моделей; грамотно оформил представленный отчет; дана содержательная интерпретация полученных при решении задач результатов; материал изложен четко; допускаются отдельные логические и стилистические погрешности, уверенно исправленные после дополнительных вопросов;

- выполнил работу в полном объеме с соблюдением необходимой последовательности; самостоятельно и рационально выбрал спецификации моделей; грамотно оформил представленный отчет; дана содержательная интерпретация полученных при решении задач результатов; допускаются отдельные логические и стилистические погрешности; обучающийся может испытывать некоторые затруднения в формулировке суждений;

0-2,4 балла выставляется, если работа не выполнена или выполнена не в полном объеме; обучающийся практически не владеет теоретическим материалом, допуская грубые ошибки, испытывает затруднения в формулировке собственных суждений, неспособен ответить на дополнительные вопросы.

Задание к лабораторной работе №2-5

Максимальная оценка -15 баллов за одну лабораторную работу. Максимально 60 баллов за лабораторные работы №2-5.

8 – 15 баллов выставляется, если обучающийся:

- выполнил работу в полном объеме с соблюдением необходимой последовательности; самостоятельно и рационально выбрал спецификации моделей; грамотно оформил представленный отчет;

- выполнил работу в полном объеме с соблюдением необходимой последовательности; самостоятельно и рационально выбрал спецификации моделей; грамотно оформил представленный отчет; дана содержательная интерпретация полученных при решении задач результатов; материал изложен четко; допускаются отдельные логические и стилистические погрешности, уверенно исправленные после дополнительных вопросов;

- выполнил работу в полном объеме с соблюдением необходимой последовательности; самостоятельно и рационально выбрал спецификации моделей; грамотно оформил представленный отчет; дана содержательная интерпретация полученных при решении задач результатов; допускаются отдельные логические и стилистические погрешности; обучающийся может испытывать некоторые затруднения в формулировке суждений;

0-7 балла выставляется, если работа не выполнена или выполнена не в полном объеме; обучающийся практически не владеет теоретическим материалом, допуская грубые ошибки, испытывает затруднения в формулировке собственных суждений, неспособен ответить на дополнительные вопросы.

3. Методические материалы, определяющие процедуры оценивания результатов освоения образовательной программы

Процедуры оценивания включают в себя текущий контроль и промежуточную аттестацию.

Текущий контроль успеваемости проводится с использованием оценочных средств, представленных в п. 2 данного приложения. Результаты текущего контроля доводятся до сведения студентов до промежуточной аттестации.

Промежуточная аттестация проводится в форме зачета.

Зачет проводится по расписанию промежуточной аттестации в письменном виде. В зачетном задании – 2 теоретических вопроса и 1 Problem. Проверка ответов и объявление результатов производится в день зачета. Результаты аттестации заносятся в экзаменационную ведомость и зачетную книжку студента. Студенты, не прошедшие промежуточную аттестацию по графику сессии, должны ликвидировать задолженность в установленном порядке.

Приложение 2

МЕТОДИЧЕСКИЕ УКАЗАНИЯ ПО ОСВОЕНИЮ ДИСЦИПЛИНЫ

Методические указания адресованы студентам очной формы обучения.

Учебным планом предусмотрены следующие виды занятий:

- практические занятия;
- лабораторные работы.

В ходе практических занятий рассматриваются методы анализа и синтеза в предметной области; современные методы эконометрического анализа; возможные ограничения применения эконометрических методов; методики совершенствования знаний в области эконометрики, даются рекомендации по самостоятельной работе и подготовке к лабораторным работам.

В ходе лабораторных работ углубляются и закрепляются знания студентов по ряду рассмотренных на практических занятиях вопросов, формируются и развиваются навыки использовать современное программное обеспечение (Econometric Views) для решения экономико-статистических и эконометрических задач обработки данных: построение таблиц, визуализация, проверка гипотез, корреляционно-регрессионный анализ, анализ временных рядов и панельных данных.

При подготовке к лабораторным работам каждый студент должен:

– изучить рекомендованную учебную литературу;

– подготовить ответы на все вопросы по изучаемой теме;

– решить домашнее задание, рекомендованное преподавателем при изучении каждой темы.

В процессе подготовки к лабораторным работам студенты могут воспользоваться консультациями преподавателя.

Вопросы, не рассмотренные на практических занятиях и лабораторных работах, должны быть изучены студентами в ходе самостоятельной работы. Контроль самостоятельной работы студентов над учебной программой курса осуществляется в ходе занятий методом устного опроса или посредством тестирования. В ходе самостоятельной работы каждый студент обязан прочитать основную и по возможности дополнительную литературу по изучаемой теме. Выделить непонятные термины, найти их значение в энциклопедических словарях.

Для подготовки к занятиям, текущему контролю и промежуточной аттестации студенты могут воспользоваться электронно-библиотечными системами. Также обучающиеся могут взять на дом необходимую литературу на абонементе университетской библиотеки или воспользоваться читальными залами.

Методические рекомендации по выполнению лабораторных работ

Laboratory work 1. Estimation of discrete choice regression models.

Description of the data files

1) File MROZ contains 753 observations of random sample married women in the USA (1975), the first 428 of which work, and the remaining 325 are not working.

The variables (for women, unless otherwise):

LFP - a dummy variable equal to 1 if the woman worked in 1975, 0 otherwise;

WHRS - number of hours of work in 1975;

KL6 – the number of children under 6 years old in the household;

K618 - the number of children from 6 to 18 years old in the household;

WA - age;

WE - education in years;

WW -average hourly earnings in 1975 (in US dollars);

RPWG - wages, reported during a survey in 1976 (not the same WW).

To use the sub-sample with the variable, you must select the employees in 1975, for which the LFP = 1;

HHRS - the number of hours of her husband in 1975;

HA - age of the husband;

HE - Education husband in years;

HW - husband's salary in 1975;

FAMINC - family income. The variable used to construct variable unearned income;

MTR - marginal rate of tax per cent;

WMED - education in the mother's;

WFED - education of his father in years;

UN - the unemployment rate in the State of residence, in%;

CIT dummy variable equal to 1 if the woman lives in a big city, otherwise 0;

AX - the number of years of experience.

Exercise 1: Reviewing the Evidence

a) Using the data from Mroz, calculate the expectation and the standard deviation, minimum and maximum for all 19 variables. Comment on the results.

b) Run a) separately for working women (428 cases) and not working (325 observations). Comment on the results. Do subsamples differ in the variables WA, WE, K618, HA, HE, HHRS? What about the descriptive statistics for the explanatory variables on KL6 and HW? Interpret the difference in AX.

c) Construct a variable PRIN unearned income by rule PRIN=FAMINC–(WHRS·WW). Calculate descriptive statistics.

d) For the subsample of 428 women employed to compute the value of a new variable LWW = LN (WW). For the entire sample, build variables AX2 = AX · AX, WA2 = WA · WA. Construct *Mincer regression* model by constant, WA, WE, CIT, AX and AX2 only for working women. Comment on the results. Using the estimates of the regression parameters, calculate the predicted values of the logarithm of wages for unemployed women, and name the variable FLWW. Compare the average values of the variables LWW and FLWW. Interpret the results. Create a new variable LWW1, LWW equal to employees, and equal FLWW for not working. Calculate the mean and standard deviation You should get 1.10432 and 0.58268 respectively.

Exercise 2: Evaluation of labor supply equation (procedure I)

a) Check that the WHRS = 0, = 0 when the LFP. Build OLS regression for the whole sample WHRS the constant WHRS KL6, K618, WA, WE, LWW1 and PRIN. The signs of the coefficients correspond to economic theory? If not - why? What is R^2? Why is it not enough?

b)The effect of uncompensated wage by the number of hours of work by Mroz can be calculated as $\partial H_i/\partial W_i=a_1/W_i$ and the income effect - as $\partial H_i/\partial V_i=a_2$. Appropriate elasticity calculated as $\partial \ln H_i/\partial \ln W_i=a_1/H_i$ and $\partial \ln H_i/\partial \ln V_i=a_2 V_i/H_i$, where a_1 and a_2 – regression coefficients for the variables $\ln W_i$ and V_i respectively. Calculate the elasticity of supply hours for the regression a) of wages and unearned income. Elasticity of of wages compensated or not? Why? Calculate the effect of uncompensated wage by the number of hours of work and the income effect on Mroz. Give an interpretation of the results.

c) Explain principal flaws of used in a) labor supply estimation procedure.

Laboratory work 2. *Time series models.*

There are data (Rosstat's information) of the monthly dynamics of electricity production in the Russian Federation in billions of kilowatt-hours. Perform analysis of the component composition of the time series of electricity production; build trend-seasonal model of energy production and obtain predictive estimate of electricity production in the first quarter of 2002 using the resulting model.

MONTH	1998	1999	2000	2001
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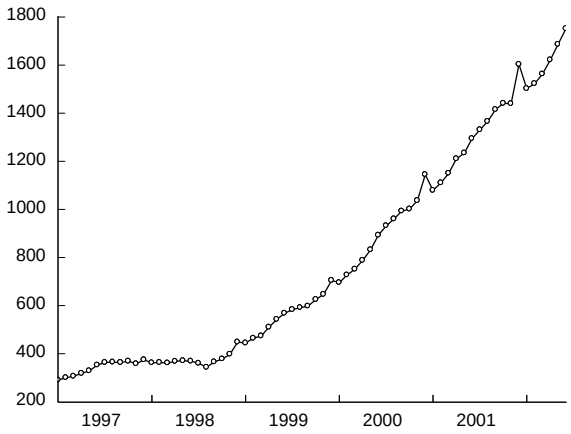
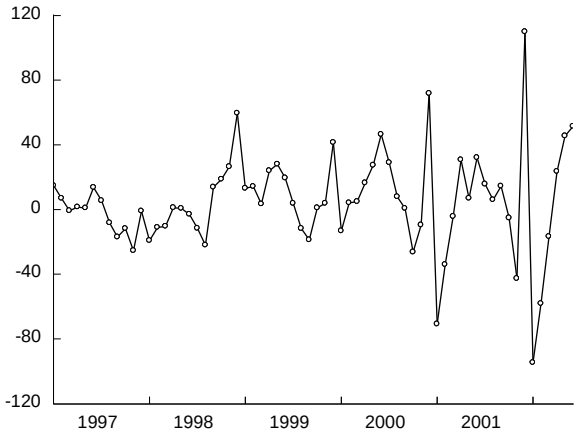
DECEMBER	85,7	87,5	90,2	92,8

Laboratory work 3. Stationarity of time series.

Consider the time series of the monetary aggregate M2 from January 1997 to June 2002.



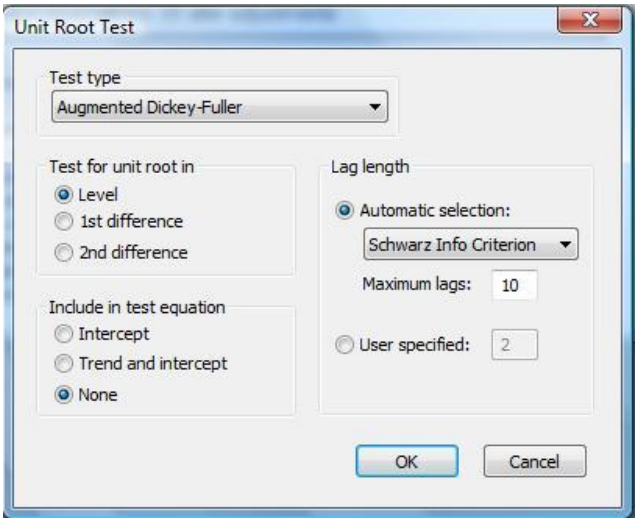
The starting time series



Detrended time series

The graph of the series shows the presence of a trend. Applying, for example, the method of exponential smoothing of the second order, we obtain after subtraction of the smoothed values from the original series the time series of the residuals, which has the form shown below in the graph. Visually we conclude that the resulting series is "similar" to the stationary time series of white noise.

Applying the testing of the obtained detrended time series for the presence of unit roots, we use the View \ Unit Root Test ... tab in the window of the time series under test. We choose ADF test without a constant in the test equation. We obtain the results presented in the table below.



The calculated value of the ADF statistics is -7.65, which is less than the critical value, equal to -1.95 for the 5% significance level. Consequently, the hypothesis of the existence of a unit root in the time series is rejected (the conclusion does not change if the constant to be included in the test equation). Thus, the original time series is a TS series.

Null Hypothesis: E has a unit root
Exogenous: None
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.647949	0.0000
Test critical values:	1% level	-2.601024	
	5% level	-1.945903	
	10% level	-1.613543	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(E)

Method: Least Squares
Sample (adjusted): 1997M02 2002M06
Included observations: 65 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
E(-1)	-0.974778	0.127456	-7.647949	0.0000

R-squared	0.477423	Mean dependent var	0.563984
Adjusted R-squared	0.477423	S.D. dependent var	43.25085
S.E. of regression	31.26582	Akaike info criterion	9.738193
Sum squared resid	62563.28	Schwarz criterion	9.771645
Log likelihood	-315.4913	Hannan-Quinn criter.	9.751392
Durbin-Watson stat	1.962042		

The KPSS test also does not allow rejecting the null hypothesis of time series stationaryness, the calculated value of LM statistics is 0.09 at a critical value at a 5% significance level of 0.46.

Tasks and exercises.

6. You use the Dickey-Fuller test of time series nonstationarity with the number of observations of 100. Evaluate the model that does not include the constant and time trend, and get the value of the statistics of 0.90, for the model with a constant and a time trend, get the value of the statistics -0.2. What are your conclusions?
7. There is a model $Y_t = 0,5 + 0,5Y_{t-2} + Z_t$, where Z_t - white noise. What is the average level of the series Y_t?
8. Perform a test for stationarity of the time series:
   c) problem 1 of Chapter 6.
   d) problem 2 of Chapter 6.
9. Process is given $y_t = 0,8y_{t-1} + 0,2y_{t-2} + \varepsilon_t - 0,9\varepsilon_{t-1}$. At what value of k will the series $\Delta^k y_t$ be stationary?
10. Generate in Eviews a time series that obeys first-order autoregression with a coefficient of 0.99. Check the series for stationarity using various tests.

Laboratory work 5. Panel data models.

File rlms578 contains observations on 5029 individuals in 1994, 1996 and 1998 in Russia - panel data. You can get a description of each of the variables by using the describe command in Stata. Numbers 5, 7 and 8 in the variable names correspond to 1994, 1996 and 1998 years respectively.

Exercise 1.

a) Get to know the content of the file rlms 578. Look at the description of the variables and their descriptive statistics.

b) File rlms578 contains data in a short format: the value of each variable is given for each year. To use the data necessary to convert data to a long format. Make this conversion by using idind as an identifier individuals and year as time identifier.

c) Estimate standard Mincer equation for cash incomes lnwg included as regressors iexp iexpsq iedu imale. Comment on the result. Estimate the regression of this type for each year (in the spatial data). Compare the results for different years with each other and across the panel estimations in general. Make conclusions.

d) Examine the impact of education on monetary incomes, using dummy variables for each level of education. Comment on the results. Give an interpretation of the coefficients. what the level of education has the most impact? Why?

e) Assess the impact of urbanization, and region of residence of the individual tested the extended Mincer equation. Include additional variables urban metro nwest central volga ncaucas ural wsiber and using the random effects model.

f) Use the random effects, fixed effects in regression lnwg on iexp iexpsq iedu imale. Which model is a priori more appropriate? Why? Use the Hausman test for testing the model specification. What result do you get? It is consistent with your expectations? Comment on the results of the model chosen. Compare the best model with the estimates obtained by OLS between.

Exercise 2.

a) Construct an equation for determining the probability of marital status. It is recommended to use the probit model with random effects. Select the model specification yourself. Give full meaningful interpretation of this equation.

b) Construct Tobit model for the logarithm of hours (censoring point must be selected lnhr = 3). Select the model specification yourself. Give full meaningful interpretation of this equation.