

ECOM20001

Econometrics 1

Lecture Note 1

Introduction

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Department of Economics
University of Melbourne

Stock and Watson: Chapter 1

Summary of Key Concepts

- ▶ What is econometrics?
- ▶ Why you should take this subject
- ▶ Prerequisites, assessment, lectures, tutorials
- ▶ Student support and feedback

What is Econometrics?

- ▶ Econometrics involves using data and statistical methods to:
 1. Empirically **estimate** economic relationships
 2. **Test** economic theories
 3. **Predict** and **evaluate** the impact of government and business policy
- ▶ In other words, using data to figure out how the world works
- ▶ Who cares?

Minimum Wage Debate in Australia



Australian minimum wage increased by Fair Work Commission to \$719.20 a week

Updated Fri 1 Jun 2018, 5:06pm

More than 2 million Australians will receive a pay rise after the Fair Work Commission increased the national minimum wage by 3.5 per cent, to \$719.20 a week.

The increase amounts to an extra \$24.30 for a 38-hour week.

The new hourly minimum rate of \$18.93 will take effect from July 1.

The Australian Council of Trade Unions wanted an increase of \$50 a week, arguing it would help Australians grappling with the rising cost of living.

But the commission ruled such a large increase would have risked reducing employment opportunities for low-skilled workers and young people.

RELATED STORY: ACTU says \$50 increase in minimum wage necessary for struggling families

By the numbers:

- Current minimum wage \$18.29 an hour, or \$694.90 a week
- From July 1 it will rise to \$18.93 an hour, or \$719.20 a week
- Increase of 3.5 pc amounts to an extra \$24.30 a week

Minimum Wage Debate in Australia

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Australia's opponents of the minimum wage increase ignore this truth: higher pay means more people working



STEPHEN KOUKULAS, MARKET ECONOMICS

JUN 4, 2018, 12:29 PM



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Minimum Wage Debate in Australia

- ▶ Does increasing the minimum wage decrease employment?
- ▶ That is, does “ \uparrow minimum wage” \Rightarrow “ \downarrow employment?”
- ▶ The critical arrow is \Rightarrow : it refers to **causality**
- ▶ Establishing causality here is a **microeconometric** problem

Stock Markets and the Macroeconomy



Stock Markets and the Macroeconomy



Stock Markets and the Macroeconomy



Stock Markets and the Macroeconomy



The Federal Reserve Board

Remarks by Governor Ben S. Bernanke

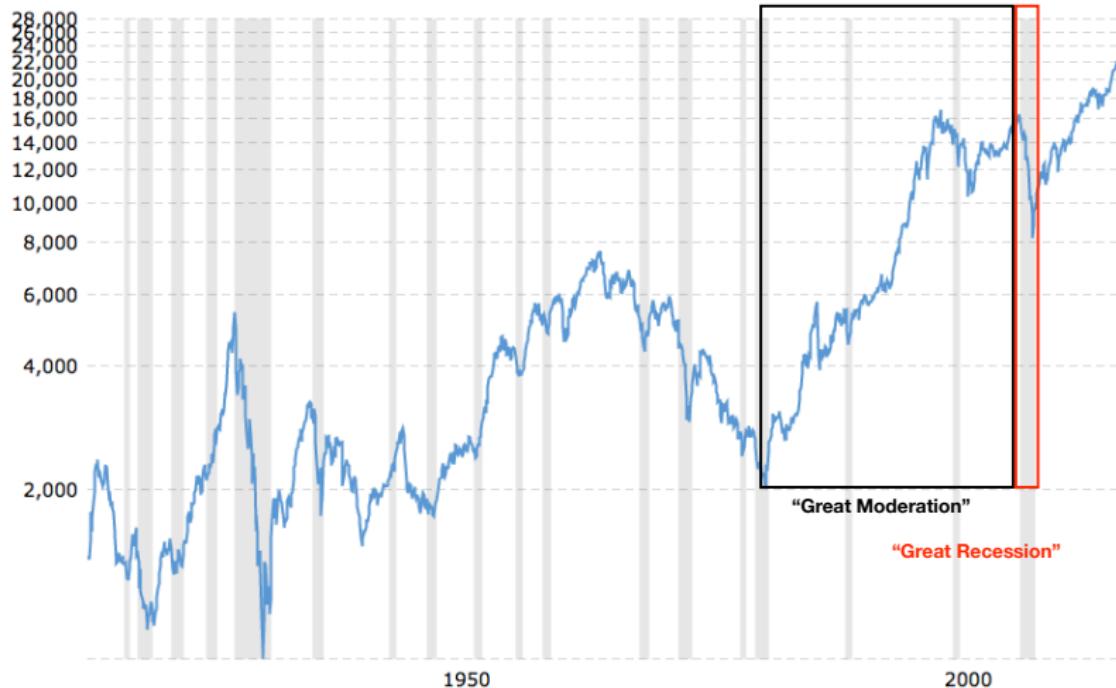
At the meetings of the Eastern Economic Association, Washington, DC
February 20, 2004

The Great Moderation

One of the most striking features of the economic landscape over the past twenty years or so has been a substantial decline in macroeconomic volatility. In a recent article, Olivier Blanchard and John Simon (2001) documented that the variability of quarterly growth in real output (as measured by its standard deviation) has declined by half since the mid-1980s, while the variability of quarterly inflation has declined by about two thirds.¹ Several writers on the topic have dubbed this remarkable decline in the variability of both output and inflation "the Great Moderation." Similar declines in the volatility of output and inflation occurred at about the same time in other major industrial countries, with the recent exception of Japan, a country that has faced a distinctive set of economic problems in the past decade.

Reduced macroeconomic volatility has numerous benefits. Lower volatility of inflation improves market functioning, makes economic planning easier, and reduces the resources devoted to hedging inflation risks. Lower volatility of output tends to imply more stable employment and a reduction in the extent of economic uncertainty confronting households.

Stock Markets and the Macroeconomy



Stock Markets and the Macroeconomy



Stock Markets and the Macroeconomy



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45

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46.7M

Likes
24

Moments
6

Donald J. Trump

@realDonaldTrump

45th President of the United States of America

⌚ Washington, DC

🔗 Instagram.com/realdonaldTrump

📅 Joined March 2009

🖼 2,495 Photos and videos



Tweets

Tweets & replies

Media



Donald J. Trump @realDonaldTrump · 16h

...big unnecessary regulation cuts made it all possible" (among many other things). "President Trump reversed the policies of President Obama, and reversed our economic decline." Thank you Stuart Varney. [@foxandfriends](#)

💬 21K ⏴ 15K ❤️ 65K

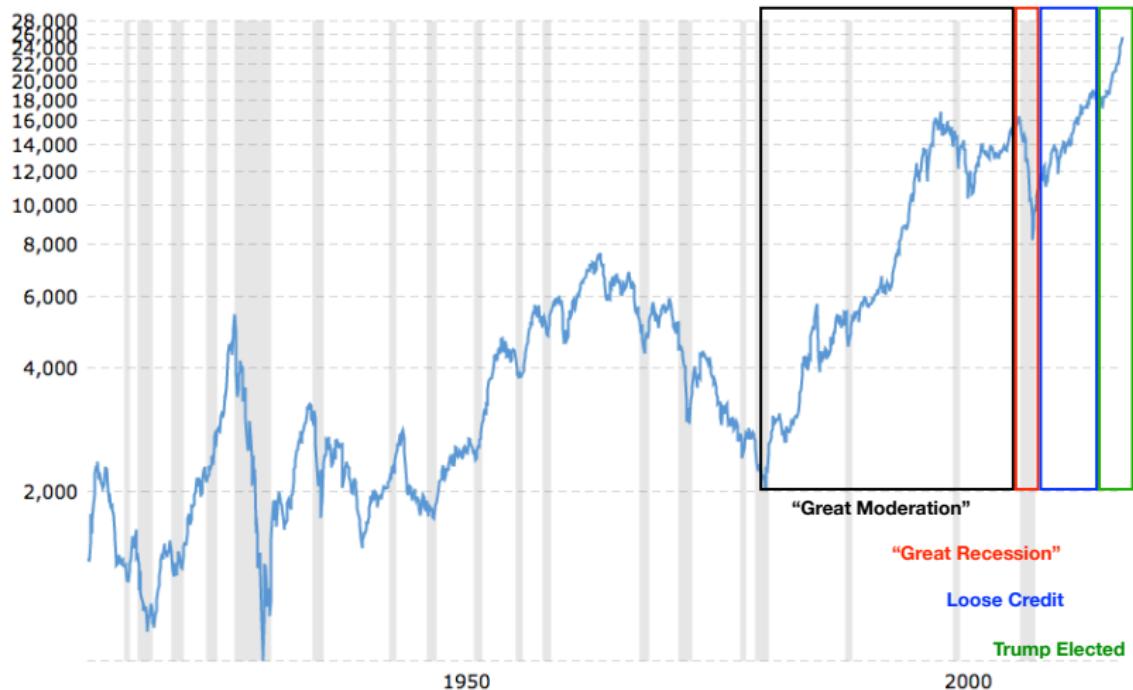


Donald J. Trump @realDonaldTrump · 16h

"President Trump is not getting the credit he deserves for the economy. Tax Cut bonuses to more than 2,000,000 workers. Most explosive Stock Market rally that we've seen in modern times. 18,000 to 26,000 from Election, and grounded in profitability and growth. All Trump, not 0..."

💬 21K ⏴ 19K ❤️ 84K

Stock Markets and the Macroeconomy



Stock Markets and the Macroeconomy

- ▶ Does “Donald Trump’s tax cuts” \Rightarrow “Stock market rally?”
- ▶ The critical arrow again is \Rightarrow : it refers to **causality**
- ▶ Establishing causality here is a **macroeconometric** problem

Despite its imminent demise, the carbon price has cut emissions

July 17, 2014 10.13am AEST

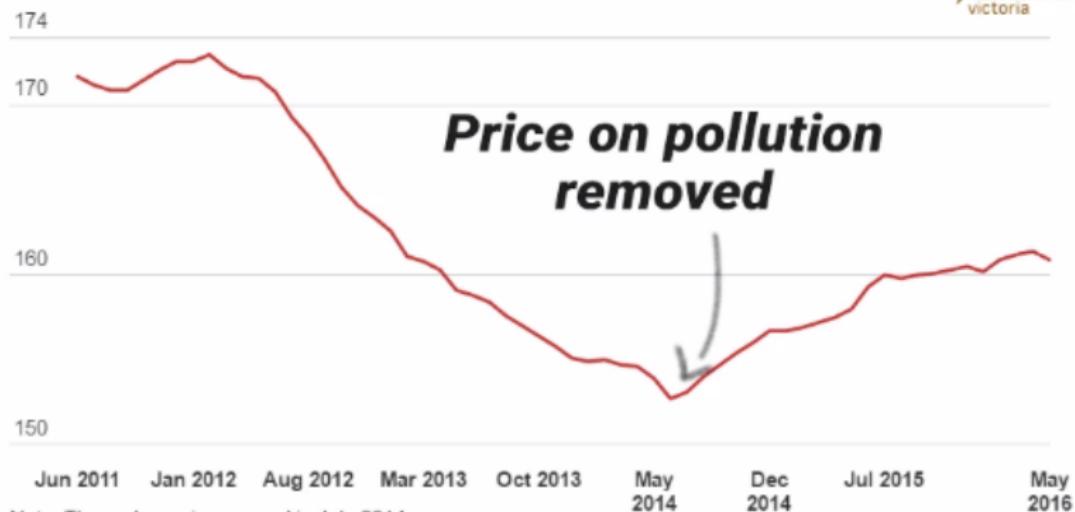
What does it mean for electricity bills, household and federal budgets, and Australia's role in the global climate effort? As our [FAQ article](#) shows, some of those answers are far from straightforward.

Meanwhile, the carbon tax's designer, Ross Garnaut, has bemoaned the fact that Australia is now [out of step with much of the rest of the world](#), while a [new analysis of electricity data](#) shows that carbon pricing was doing an effective job of cutting emissions.

Carbon Taxes

National electricity market emissions

Million tons of carbon dioxide equivalent



Note: The carbon price ceased in July 2014



Source: [pitt&sherry Get the data](#)

Carbon Taxes

Why is everyone talking about a carbon tax? The carbon pricing debate explained

By political reporter [Stephanie Anderson](#)

Updated 7 Dec 2016, 11:18am

The debate over pricing carbon has been reignited after the Government's Environment spokesman confirmed – and then backtracked on comments - that introducing a carbon price for power companies would be considered as part of a climate change review.

It's a politically touchy topic — the ousting of Malcolm Turnbull as opposition leader in 2009 and Kevin Rudd as prime minister in 2010 can both be attributed in part to positions on emissions trading schemes (ETS).

It's also a topic with a long history. Former prime minister John Howard first floated the idea of an ETS in 2007.



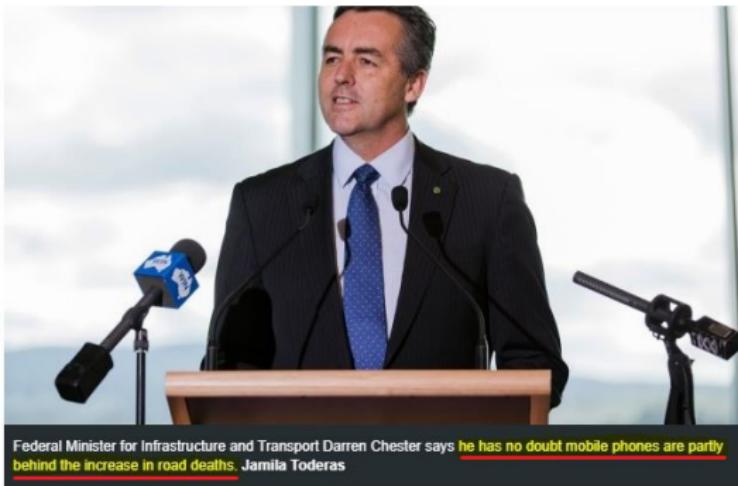
PHOTO: Former prime minister John Howard first floated the idea of an ETS in 2007. (AAP: Dean Lewins)

RELATED STORY: [Carbon price back on the table in climate policy review](#)

Car Accident, Tolls, and Mobile Phones

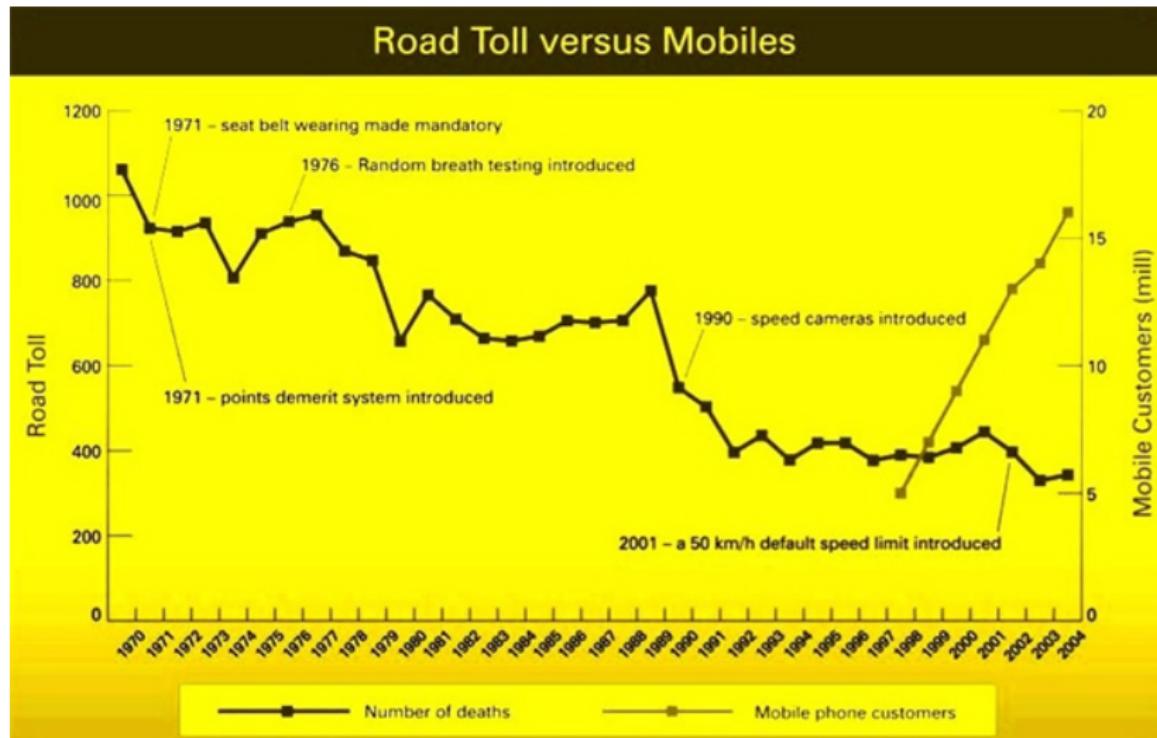
Mobile phones behind rising road fatalities, says minister

✉ G+ f 🐦 in 📺

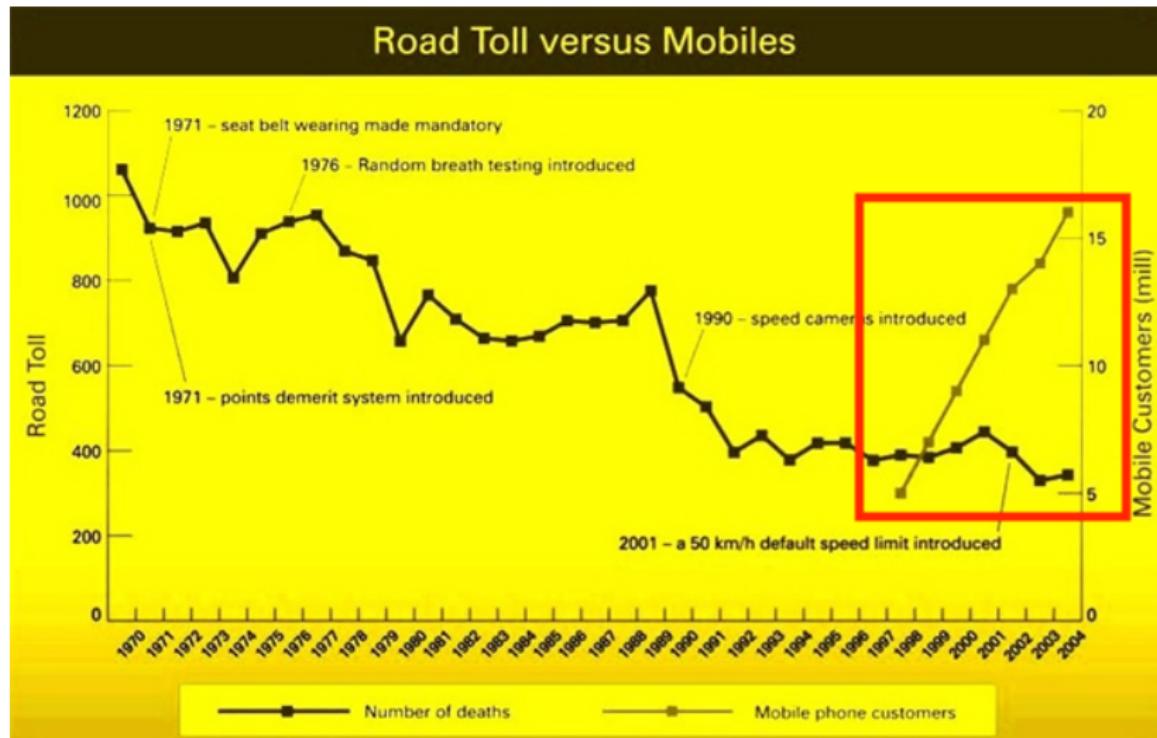


Federal Minister for Infrastructure and Transport Darren Chester says he has no doubt mobile phones are partly behind the increase in road deaths. Jamila Toderas

Car Accident, Tolls, and Mobile Phones



Car Accident, Tolls, and Mobile Phones



Why You Should Take This Subject

- ▶ All of these examples of trying to establish causal relationships are drawn from research that uses econometrics
 - ▶ does ↑ carbon taxes \Rightarrow ↓ pollution?
 - ▶ does ↑ mobile phones \Rightarrow ↑ traffic accidents?
- ▶ To address policy and business-relevant questions using microdata or macrodata, training in econometrics is essential
- ▶ In an increasingly data driven world, having the ability to use data to figure out how the world works is becoming even more important
 - ▶ Related to this is being able to figure out what is correlation and what is causation
 - ▶ “correlation is not causation”

Why You Should Take This Subject

- ▶ We will lay a foundation in econometric **methodology** so that you can start tackling such problems with data
- ▶ Through **applications**, we will illustrate the use of econometrics, and while doing so show that economics is not just about money, banking and the macroeconomy!
 - ▶ gender, development, crime, poverty, inequality, health, environment, marriage, education, discrimination, energy, collusion, taxes, wages and employment, international trade, wars and conflict, poverty, experiments, transportation
- ▶ To undertake applications, you will be trained in a state-of-the-art, high-demand statistical program called **R**
- ▶ I also want you to be able to carefully assess (possibly false) claims about causality, and treat “researchers have shown” articles in the popular press with considered **skepticism**

Fried Chicken Kills You (!?)

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Eating fried chicken weekly could lead to early death, study finds

Josh Hafner, USA TODAY

Published 3:22 p.m. ET Jan. 24, 2019 | Updated 12:58 p.m. ET Jan. 27, 2019

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Ah, fried chicken. (Photo: Pimongpin Tangsool, Getty Images)

How would you like your death: regular, or extra early?

A new study links regular fried chicken consumption – one serving a week or more – to a 13 percent increased risk of premature death, at least among older women.

Researchers looked at nearly 107,000 postmenopausal women who tracked their diets in the 1990s for a nationwide study that followed them until 2017. But a fatal link to fried chicken may exist for other groups, too.

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The Team

- ▶ Lecturer: David Byrne
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 - ▶ Office: FBE Building, Room 436
 - ▶ Canadian
- ▶ Tutorial Coordinator: Richard Hayes
 - ▶ Email: rjhayes@unimelb.edu.au
- ▶ Experienced group of great tutors

Weekly Schedule

- ▶ Two weekly **lectures**
 - ▶ Tuesdays 4:15pm-5:15pm, The Spot-B01 (Copland Theatre)
 - ▶ Thursdays 1:00pm-2:00pm, The Spot-B01 (Copland Theatre)
 - ▶ Overflow theatre is The Spot-Level 1 Lecture Theatre
 - ▶ **extremely unlikely we need the overflow theatre**
 - ▶ if you have been assigned it on your timetable, please come to The Spot-B01 (Copland Theatre) for lectures
- ▶ One weekly one-hour **tutorial**
 - ▶ please use the Student Portal to enrol in tutorials and check with Stop 1 if any issues arise
- ▶ One weekly **online quiz** that you complete on Canvas site
- ▶ **LMS website:** Check regularly for lectures, quizzes, assignments, tutorials, and announcements
- ▶ **Syllabus** is available for download under the 'Subject Information' section of Canvas site. Contains lecture-by-lecture **reading list** and other subject details.

Prerequisites and Exclusions

- ▶ Subject prerequisite is **any one** of the following subjects:
 - ▶ ECON10005: Quantitative Methods 1
 - ▶ MAST10010: Data Analysis 1
 - ▶ MAST10011: Experimental Design and Data Analysis
 - ▶ MAST20004: Probability
 - ▶ MAST20006: Probability for Statistics
- ▶ Non-allowed subjects - you may not gain credit for both:
 - ▶ ECOM20001: Econometrics 1 (**this subject!**)
 - ▶ ECOM30001: Basic Econometrics

Assessment

Date	Semester Week(s)	Assessment Item	Grade Weight
8 April	5	Assignment 1	5%
6 May	8	Assignment 2	5%
27 May	11	Assignment 3	5%
	1-12	Tutorial Attendance and Participation	5%
	1-12	Weekly Quizzes	10%
TBD	>12	2-Hour Final Examination	70%

Assessment

Details - Assignments

- ▶ Assignments
 - ▶ involves exam-type questions and data analysis
 - ▶ due at 8am on:
 - ▶ A1: Monday 6 April (week 6)
 - ▶ A2: Monday 4 May (week 9)
 - ▶ A3: Monday 25 May (week 12)
 - ▶ submit online via Canvas
 - ▶ solutions are posted just after 8am on these dates
→ late assignments are **not** accepted and will mean a **0**
 - ▶ students may submit assignments individually, or as a group of up to 3 (max)

Assessment

Details - Tutorial Attendance and Participation

- ▶ 5% Tute Grade for the semester is computed as:

$$\text{Tute Score} = 5 \times \frac{\min\{\#\text{ of tutes attended}, T\}}{T}$$

where T is the number of tutorials you are on-shore in Australia for

- ▶ for “on-shore” students currently in Australia, $T = 12$
- ▶ for all other students unable to be on campus because of the coronavirus travel ban
- ▶ T will be set to the number of weeks you are on campus for once the ban is lifted (which we will confirm with the University at a later date)
- ▶ we will ensure no student is penalized for missing a tutorial because of the travel ban

Assessment

Details - Tutorials

- ▶ You must attend your officially-assigned tutorial from the University to earn your attendance mark for the week
- ▶ **To be clear:** your participation grade will be 0 in a given week if you fail to attend your assigned tutorial, even if you attend some other tutorial that you have not been assigned to
- ▶ Can miss 2 of T tutes without any penalty.
→ covers excuses for missing your assigned tutorial, except for severe medical circumstances with doctor's note

Assessment

Details - Quizzes

- ▶ Weekly Quizzes

- ▶ Monday at 8am each week ...
 - ▶ deadline for submitting your answers to a 3-question quiz on the previous week's lecture and tutorial
 - ▶ solutions for the quiz are posted on Canvas just after 8am
→ late quiz submissions are **not** accepted and will mean a **0**
 - ▶ quiz for the next week will be posted on Canvas
- ▶ 10% Quiz Grade for the semester is computed as

$$\text{Quiz Score} = 10 \times \frac{\text{Avg. of Best 10 of 12 Quiz Scores (out of 3)}}{3}$$

- ▶ So you can miss submitting (or mess up) 2 of 12 quizzes throughout the semester without penalty
→ covers excuses for all missed quiz submissions except for severe medical circumstances with doctor's note

Assessment

Details - Quizzes

- ▶ I hate quizzes, Dave why are you doing this to us???
 - ▶ ensures consistent feedback
 - ▶ incentive to review lecture notes and tutorials
 - ▶ extremely prepared for the final exam, assignments
 - ▶ helps to create long-term knowledge retention
 - ▶ work in groups - you learn the most from your peers!

Assessment

Details - Quizzes

- ▶ My advice for doing well on quizzes and getting the most out of them in terms of learning:
 1. Monday: work through the lecture notes and tutorials for the upcoming week, and look at the quiz questions for the current week while doing so.
 - ▶ you can use the recommended readings list provided on Canvas site under the 'Lectures' tab to see what will be covered in the upcomign week
 2. Through the week: attend lectures and tutorials, talk to your peers about the quiz questions
 3. Friday: finalise and submit your quiz answers on Canvas
- ▶ You can save your answers on Canvas site as your work through them, but you can only submit them once.
→ your answers are final once you submit your quiz on Canvas; you cannot resubmit

Assessment

Details - Final Exam

- ▶ 2-Hour Final Examination
 - ▶ Please do not make travel plans during the exam period
 - ▶ Faculty **hurdle requirement**: **you must pass the final examination to pass the subject**

References

- ▶ Main reference for the subject are the **lecture notes**
- ▶ Subject textbook: **Introduction to Econometrics**, Global Edition, 4th Edition, by James H. Stock and Mark W. Watson, 2015 (ISBN-13: 978-1-292-26445-5)
 - ▶ this textbook is also used in ECOM30002: Econometrics 2
 - ▶ a world standard used for econometrics teaching
 - ▶ any other variant on the 3rd edition of the textbook, or even the 2nd edition will work just fine
- ▶ Other econometrics texts that can be taken out at the library
 - ▶ Introductory Econometrics by Wooldridge, Wadud and Lye
 - ▶ Basic Econometrics (5th ed.) by Gujarati and Porter
 - ▶ A Guide to Econometrics (6th ed.) by Kennedy

Preparing for lectures

- ▶ My advice for preparing for lectures week-to-week
 - 1. Review lecture notes for upcoming lecture
 - 2. Take notes during lecture, flush out the details, ask questions!
 - 3. Go to tutorials, ask more questions!
 - 3. Review lecture recordings and/or textbook for additional background on specific topics, email questions!
- ▶ Only material covered in the lecture is relevant for tutorials, assignments, and finals.
 - ▶ if there's material in the book that we do not cover in the lecture, then you are not responsible for knowing it
 - ▶ email if you're unsure
- ▶ From week 2, we also have the Online Tutor set-up on Canvas site where you can ask questions directly to our tutors online

Tutorials

- ▶ **Before** the tutorial
 - ▶ Download tutorial code, data, and questions from Canvas
 - ▶ Read over the assignment, then run the code with the data
 - ▶ The code will produce some key figures and tables that you will be asked to potentially present to your tutorial group.
 - ▶ Think about how you would answer the questions, write down some notes.
- ▶ **During** the tutorial
 - ▶ You will work in groups to discuss the code and output
 - ▶ In the remaining tutorial time, tutors will discuss concepts from class or go through practice problems
 - ▶ Week-to-week, we will also be posting **tutorial videos** on Canvas where a tutor works through a tutorial

Software - R

- ▶ We will use the **R statistical computing program** for doing econometric analyses in the tutorials and on assignments
- ▶ Our assumption: you know absolutely nothing about R
- ▶ Tutorials and assignments are structured accordingly
 - ▶ for the assignments, you will need to copy-and-paste R codes from the tutorials and change data names
 - ▶ we **do not** expect you to do independent coding
- ▶ Historically, this subject has used a program called EViews
 - ▶ requires students to click commands
 - ▶ with R, we will require students to copy-and-paste commands

Why are we using R?

- ▶ Convenience
 - ▶ R is free
 - ▶ you can download it on a Mac/Windows computer at
<https://www.r-project.org/>
 - ▶ after downloading R, you can download RStudio as well, which is the user-friendly interface for doing data analysis
<https://www.rstudio.com/>
 - ▶ R is also on all computers in the The Spot computer labs
 - ▶ but feel free to work off of your own laptop
 - ▶ substantial collection of online resources to complement the variety of resources we provide in this subject
- ▶ Relevance
 - ▶ R is now being used everywhere in business worldwide
 - ▶ it can handle econometrics (this subject!)
 - ▶ can also handle “Big Data”
 - ▶ listing R on your resume is a major plus for job applications

Why are we using R?

- ▶ Structure
 - ▶ ECOM30002: Econometrics 2 (3rd Year) and ECOM40006: Econometrics 3 (Honours) now use R
 - ▶ We have streamlined the software (and textbook) for our undergraduate econometric curriculum around R
 - ▶ We will be one of few departments worldwide that properly streamline econometrics software for teaching and application
 - ▶ Differentiates our students both domestically and internationally. As faculty, we take pride in this.
 - ▶ Also addresses complaints from previous students
- ▶ Learning to Learn
 - ▶ In an increasingly data-driven world, in most jobs now you will be asked to learn a new IT or statistical program
 - ▶ Learning how to learn how to use a new program is an important skill
 - ▶ Many past students have given this as a key skill from their undergraduate subjects

Support

- ▶ Lecturer consultation hours:
 - ▶ Thursdays, 2:00pm-4:00pm
- ▶ Tutors consultations
 - ▶ Each week, each tutor will have a one-hour consultation time
 - ▶ Tutor consultation times are posted on Canvas website
 - ▶ Students can attend the consultation times of any tutor they choose without restriction
- ▶ Online consultations using Zoom
 - ▶ We will also hold consultations online on Canvas using Zoom
 - ▶ Lecturer (Dave) will be online from 3-4pm on Thursdays
 - ▶ Two of the tutor consultations will also be online using Zoom
 - ▶ 2-3pm on Wednesdays with Silvia
 - ▶ 2-3pm on Fridays with Chin

Support

- ▶ Online discussions of subject on Canvas
 - ▶ Online Tutor: **official** question and answer forum for students with tutors
 - ▶ Canvas Discussion: **unofficial** question and answer form among students only
 - ▶ Both forums are monitored daily, tutors only respond to questions on Online Tutor
- ▶ Tutors will run additional revision lectures and pitstops
 - ▶ Before the final exam
 - ▶ Times and locations will be posted on Canvas

Feedback

- ▶ Feedback on R training
 - ▶ Through the subject, we will be learning along the way the best way(s) to teach R
 - ▶ Please provide feedback whenever you have any
 - ▶ We know you are learning a new program and tutors will be helping at every step.
 - ▶ Also, please work with your peers!
- ▶ More generally, as this is the first time we teach ECOM20001, getting your feedback is especially important
 - ▶ Typos on lecture slides/tutes/assignments
 - ▶ Topics that were not clearly taught
 - ▶ R codes not clearly written
 - ▶ Any other sources of confusion or lack of clarity

Summary of Weekly Online Support and Activity

Particularly Important for Students Currently Overseas (all times local in Melbourne)

- ▶ Mondays
 - ▶ submit weekly quiz and assignment (if due that week) by 8am
 - ▶ tutorial solutions posted from previous week
 - ▶ new quiz posted on Canvas
- ▶ Tuesdays
 - ▶ lecture 1 posted online by 6:15pm
- ▶ Wednesdays
 - ▶ online office hours on Canvas via Zoom, 2-3pm with Silvia
- ▶ Thursdays
 - ▶ lecture 2 posted online by 3pm
 - ▶ online office hours on Canvas via Zoom, 3-4pm with Dave (me)
 - ▶ tutorial videos posted online by 5pm
- ▶ Fridays
 - ▶ online office hours on Canvas via Zoom, 2-3pm with Chin
- ▶ Online discussions everyday of the week on Canvas
 - ▶ Online Tutor (official) and Discussion Board (unofficial)

Summary

- ▶ Econometrics is about **using data to figure out how the world works**
- ▶ In this subject, we are going to cover foundations of econometric methods, which only get enriched in later theoretical and applied econometrics subjects
- ▶ We will also learn a state-of-the-art statistical program (R) for doing econometrics
- ▶ Econometric techniques, motivated by applications, will be taught in lectures
- ▶ These techniques will be used in tutorials that are designed to encourage you to learn the methods as a team in groups