**Essential Talking Points:**

* Outline whole diss – comparing different MRR models on an equity fund dataset
* Focus specifically on MANOVA Stepwise Selection

Introduction:

* What is MRR?
* Why is it needed? – on slide
* Mention: considering response intercorrelation means considering the covariance between responses because **correlation is just scaled covariance.**
* Going to start with the simplest example of an MRR model

Multiple Response Linear Regression (MRLR):

* Follows from Single Response linear regression – explain each part of the equation
* **Difference: shared covariance structure of the errors** through multivariate normal distribution in errors
* **In single response this is zero and if we used several independent single-response models – each error would just have its own normal distribution**
* This shared structure is important as it allows it to consider the response covariance and hence the correlation in the responses.

MRLR Example:

* **Be patient on this slide** – emphasise the values are not important – they just give a visual representation
* **Differences from single response:** Response, coefficient and error **matrices** andNOT vectors
* Now going into the MANOVA Stepwise Selection – what is MANOVA – why do we need it?

MANOVA:

* Measures impact of predictors on response variation, which is the **unscaled version of the response covariance matrix**

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* It involves partitioning the response variation into 2 components: the variation explained by the predictors and the variation not explained
* This partition considers response covariance structure through the off-diagonal elements, which is essential for MRR
* Remember, explain how to calculate predicted values using OLS estimator as in single response
* Then, talk about the multiple tests you can do with MANOVA – used Wilks’ Lambda

Wilks’ Lambda:

* More interpretable than the other tests
* Measures ratio of determinants of the unexplained SSCP matrix and total SSCP matrices
* Why is this useful?

F-Statistic:

* Useful because we can derive an F-statistic from it, we want a lower Wilks’ Lambda, hence a higher F-statistic and a lower p-value for a model
* Here are the 2 hypotheses we would ultimately be testing when evaluating predictors
* So, how can we use this in an MRR model?

(Sequential) MANOVA Stepwise Selection:

* We can firstly use Sequential MANOVA – which is just MANOVA, but you can compare nested models – i.e. models which are only 1 predictor apart
* This can be combined with stepwise selection to give us a valid MRR model selection method, where selected predictors are used in MRLR.
* **Explain results** – explain what each range of values mean for ANRMSE
* TBC depending on above…
* Where does this leave us?

Conclusion:

* Evaluate how MANOVA Stepwise Selection did – explain how more complex models are needed
* Talk about what the report is in general
* Then how this can be extended – lots of different datasets – more holistic model comparison – or use even more MRR models on this dataset.