



# Asset Allocation

*Assignment 2019*

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**UNIVERSITÉ  
DE GENÈVE**

GENEVA SCHOOL OF ECONOMICS  
AND MANAGEMENT

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# AGENDA

1

Data & Summary Statistics

2

Real Estate Role in a Portfolio

3

Portfolio Construction under OPP2 Constraints

4

Comparison & Results

# 1

## Data & Summary Statistics

### 1. Data

Dataset of quarterly total returns from Jan 1999 until March 2019 ( 20.25 years)

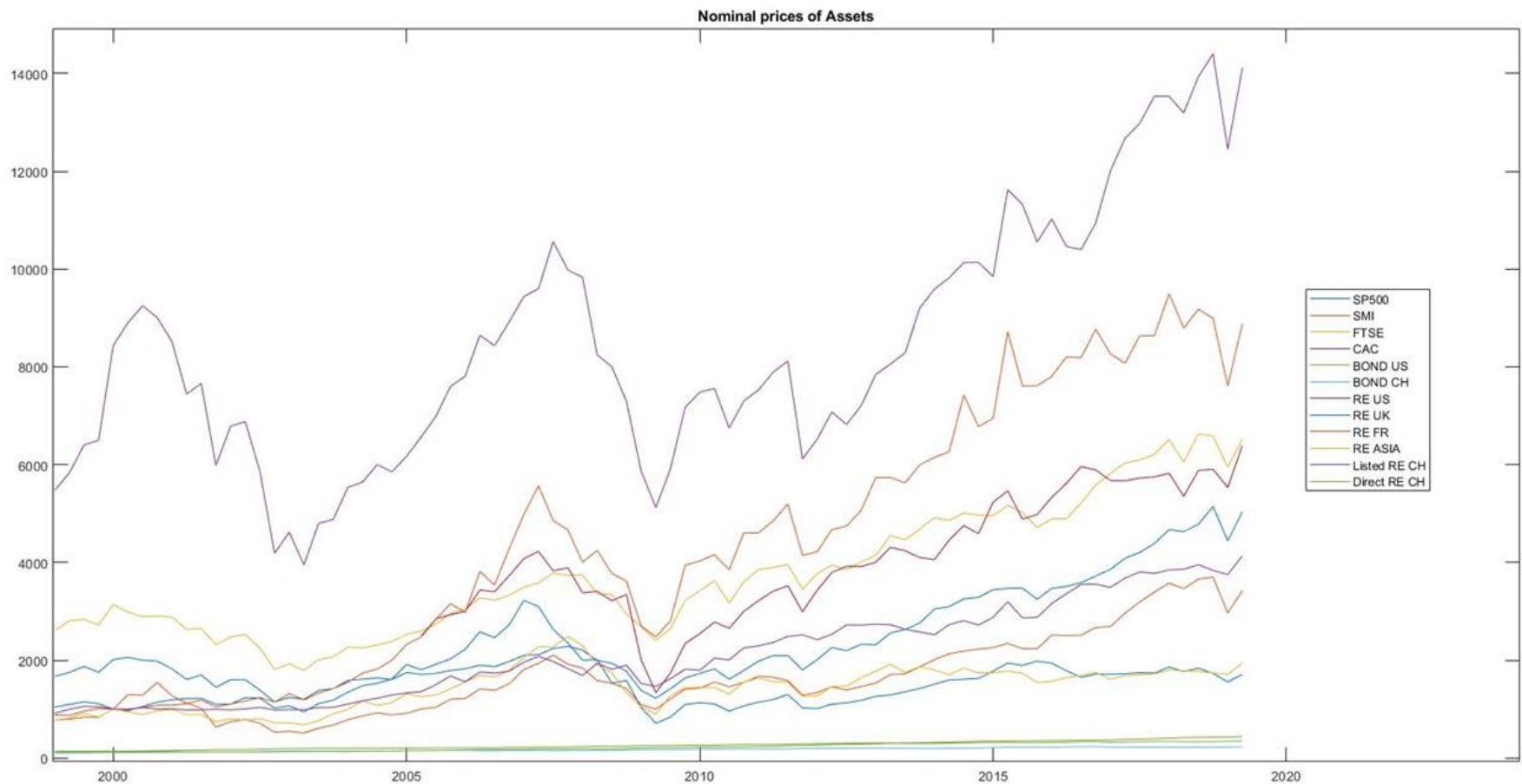
- Extracted from Bloomberg
- Major stocks indices : SMI20, S&P500, CAC40, FTSE100
- Bonds (Aggregate US and CH GOV bonds)
- Listed NAREIT from USA,UK,CH,FR,ASIA
- Direct Swiss Real Estate, SWX IAZI



# 1

## Data & Summary Statistics

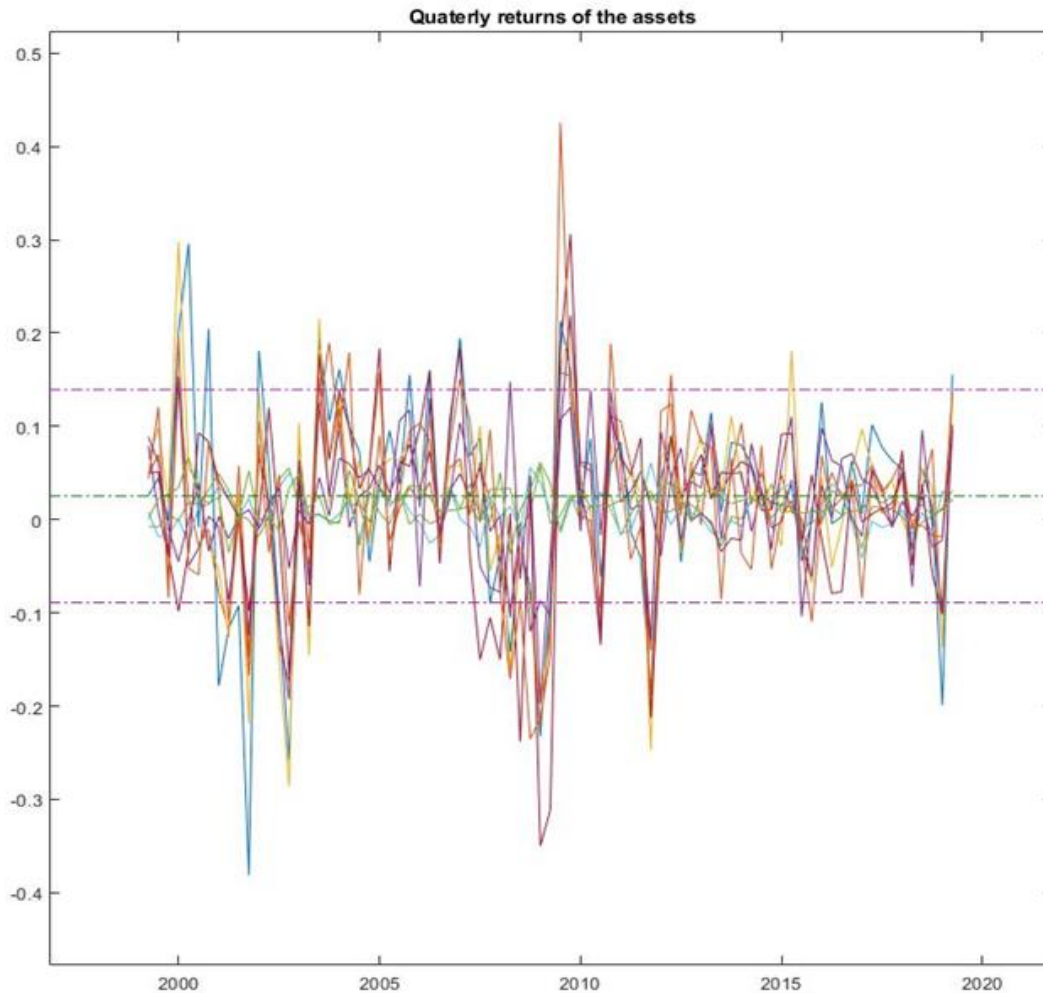
### 2. Summary Statistics - (Nominal) Price Evolution



## 1

# Data & Summary Statistics

## 3. Summary Statistics - Quarterly asset returns

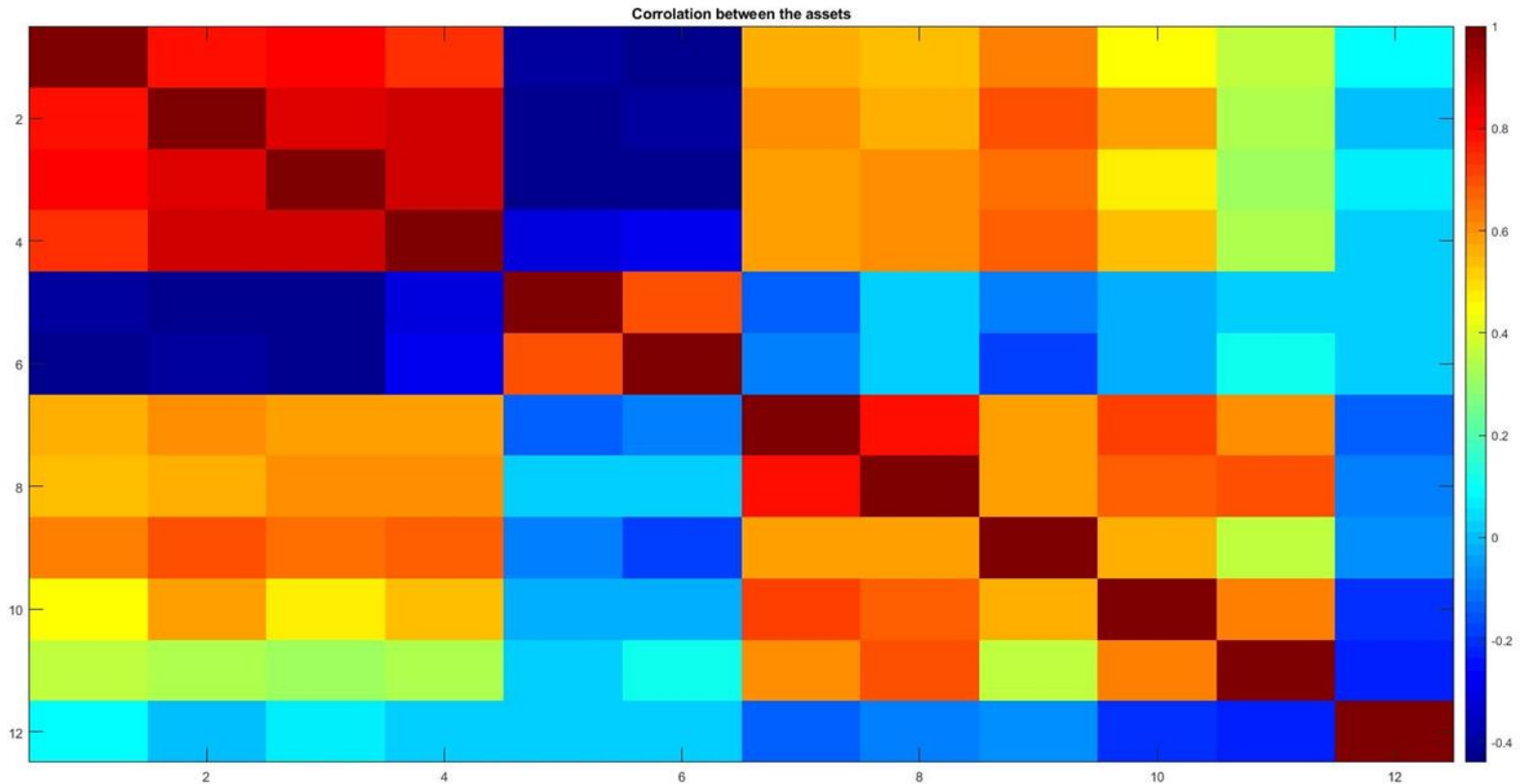


Mean	2.527%
Median	3.681%
Standard deviation	11.41%

# 1

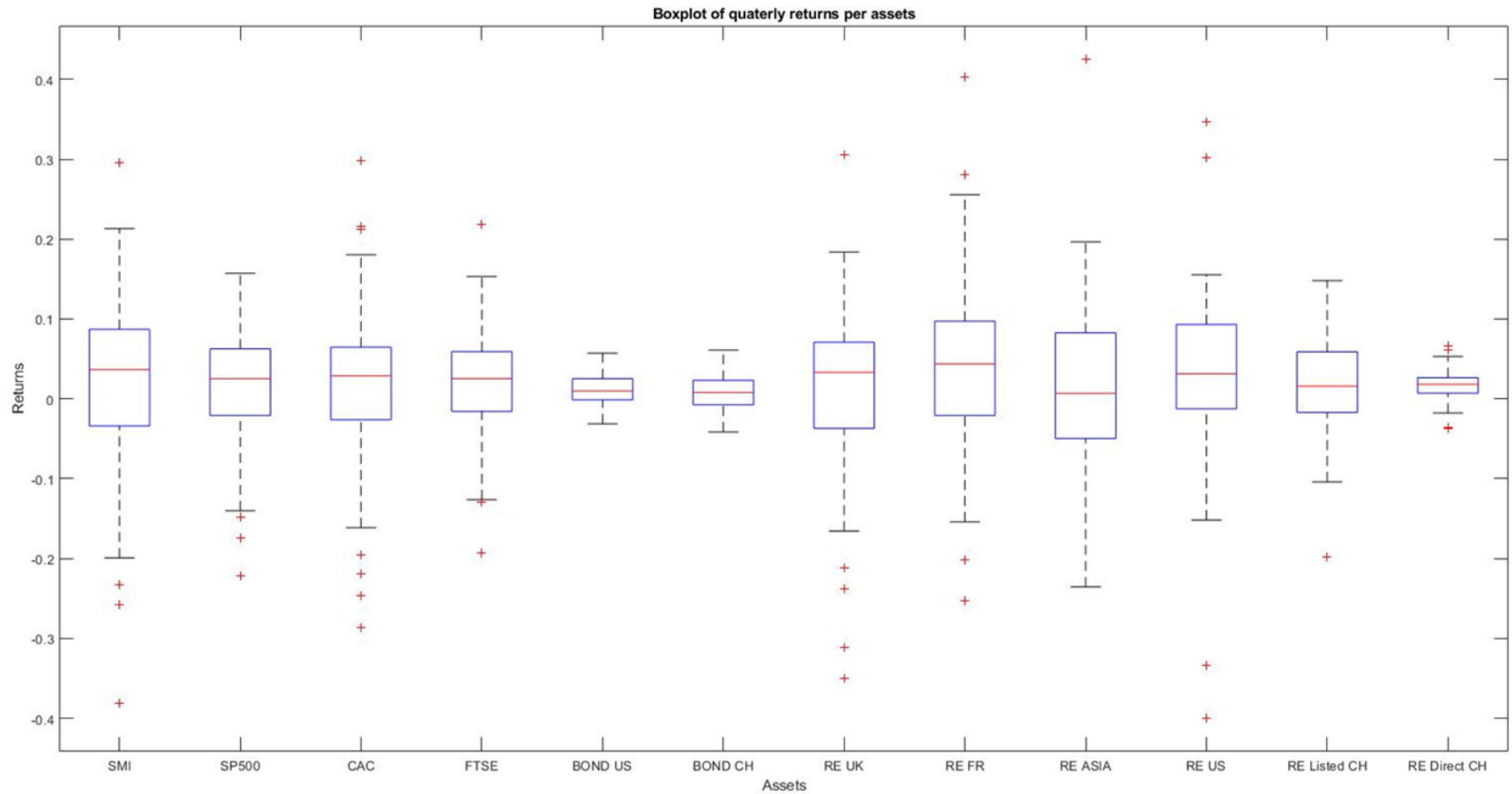
## Data & Summary Statistics

### 4. Summary Statistics - Correlation of the returns



## 1

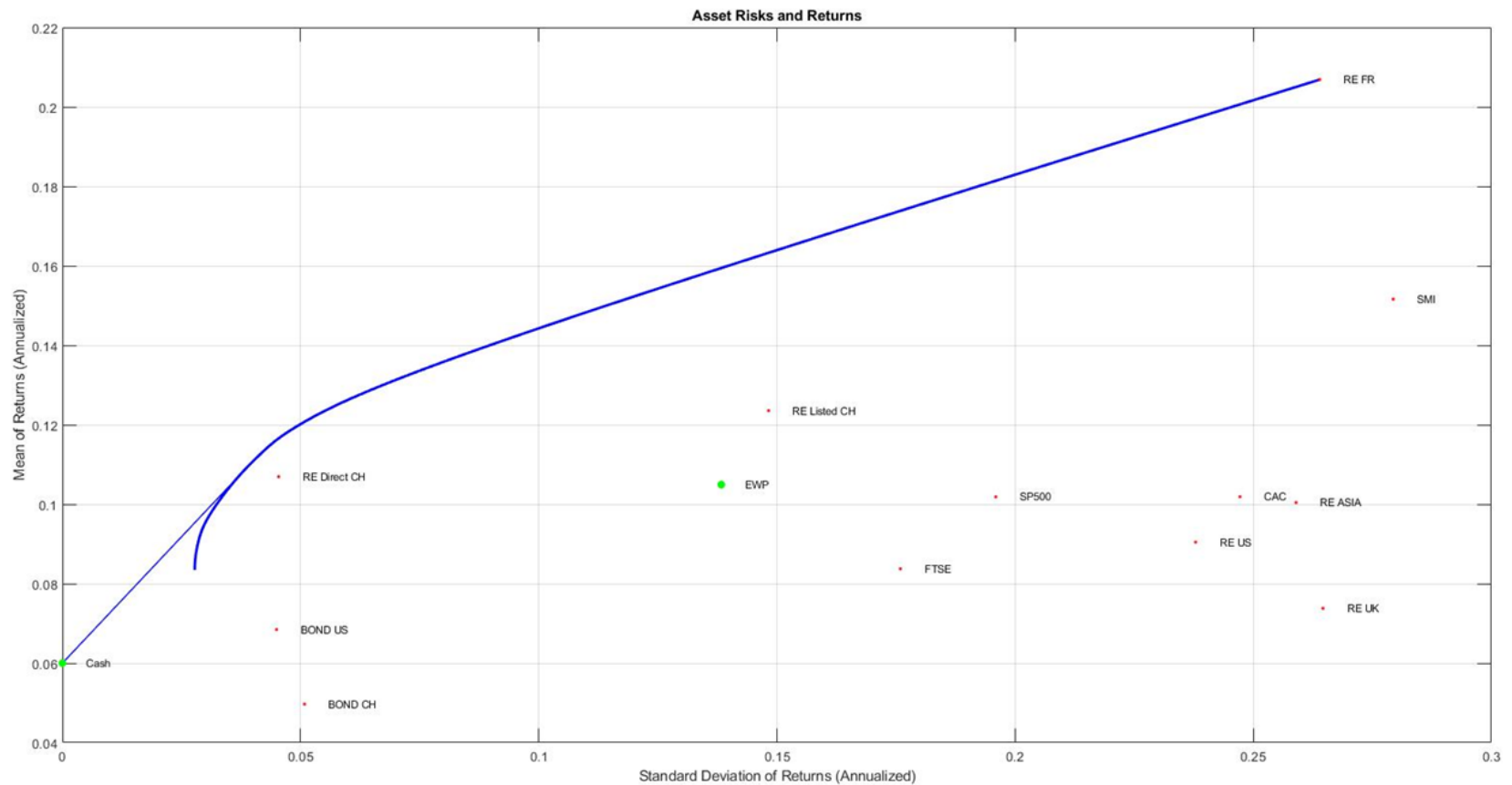
# Data & Summary Statistics



# 2

## Real Estate Role in a Portfolio

### 1. Portfolio (All assets)

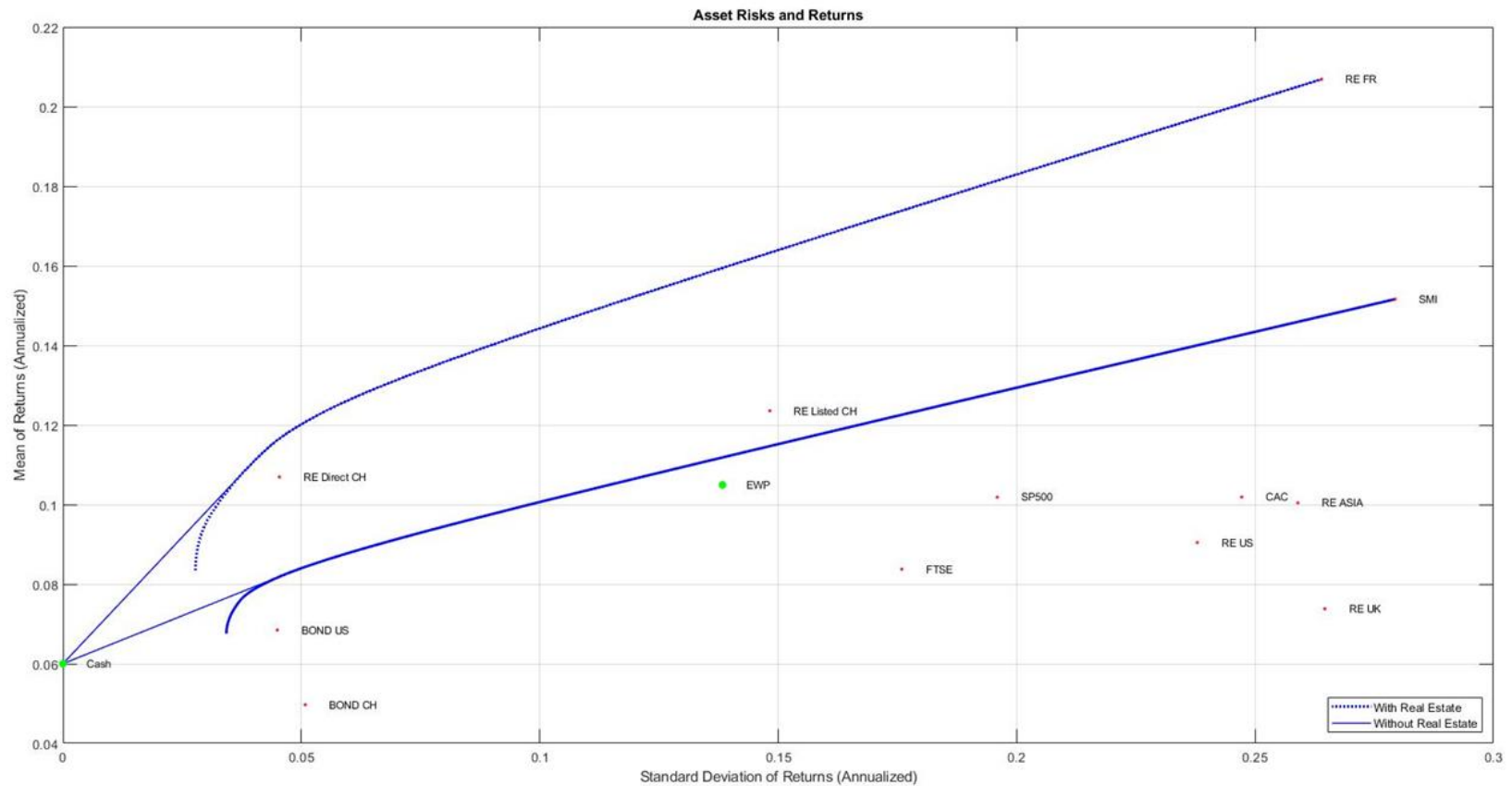




# 2

## Real Estate Role in a Portfolio

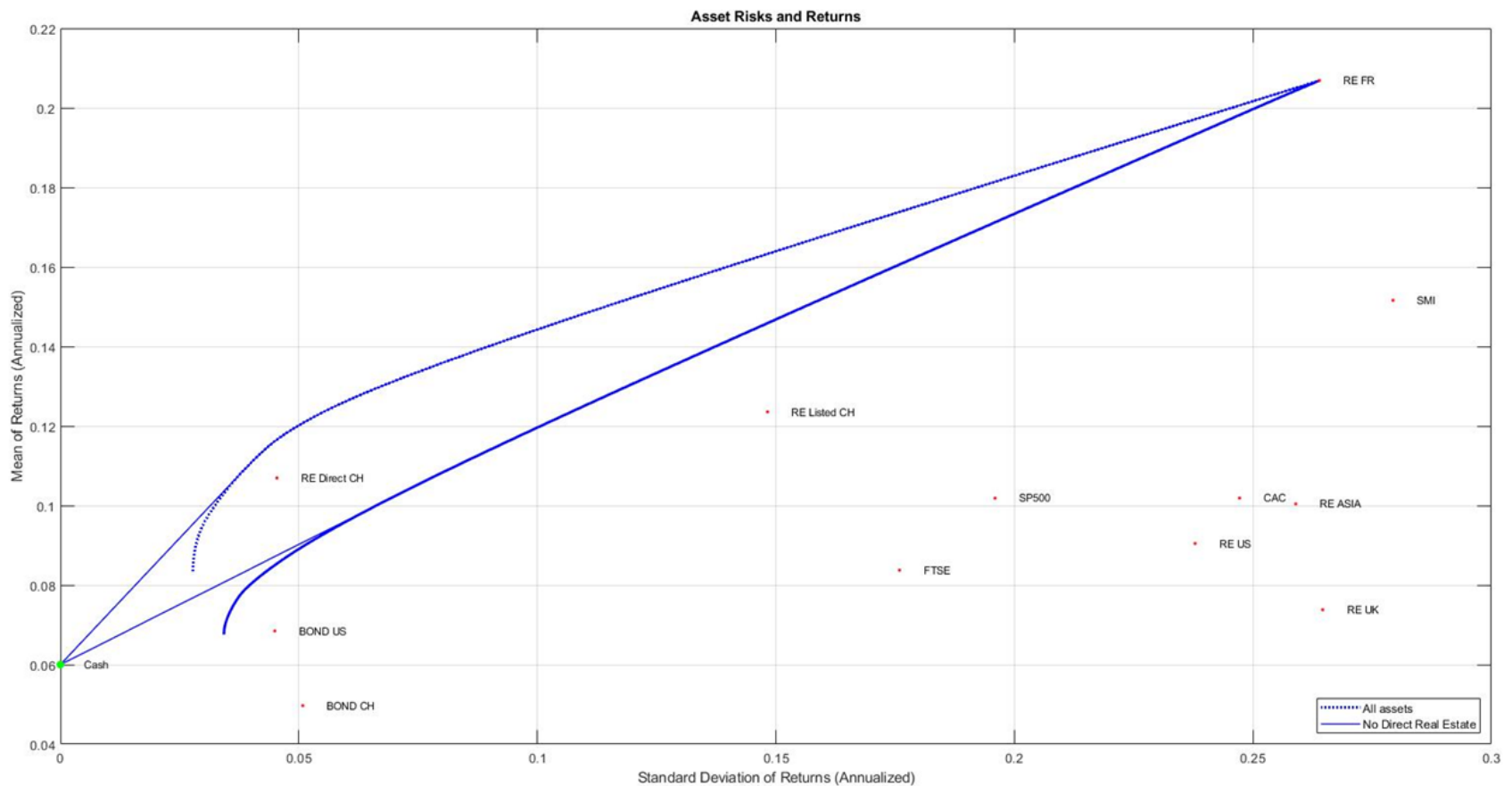
### 3. Efficient frontier (No RE)



## 2

# Real Estate Role in a Portfolio

## 2. Portfolio without Direct RE



# 3

## Portfolio Construction under OPP2 Constraints

### 1. Relevant Articles

- **Art 50 al 3 & Art 52 - Specific requirements**

- ☐ Risk allocation
- ☐ Time horizons
- ☐ Liquidity

- **Art 53 - Authorized investments**

- ☐ Cash amounts
- ☐ Stocks
- ☐ Bonds
- ☐ **Property**
- ☐ Participation certificates
- ☐ Alternative investments

- **Art 53 al. 5 - Leverage**

- ☐ Stocks and bonds : not allowed
- ☐ **Real estate** : refer to **art. 54b al.2**; Max 30% of property's market value on external financing

- **Art 54b al 1 - Real Estate Requirements**

- ☐ Max 5% of total fund wealth per property

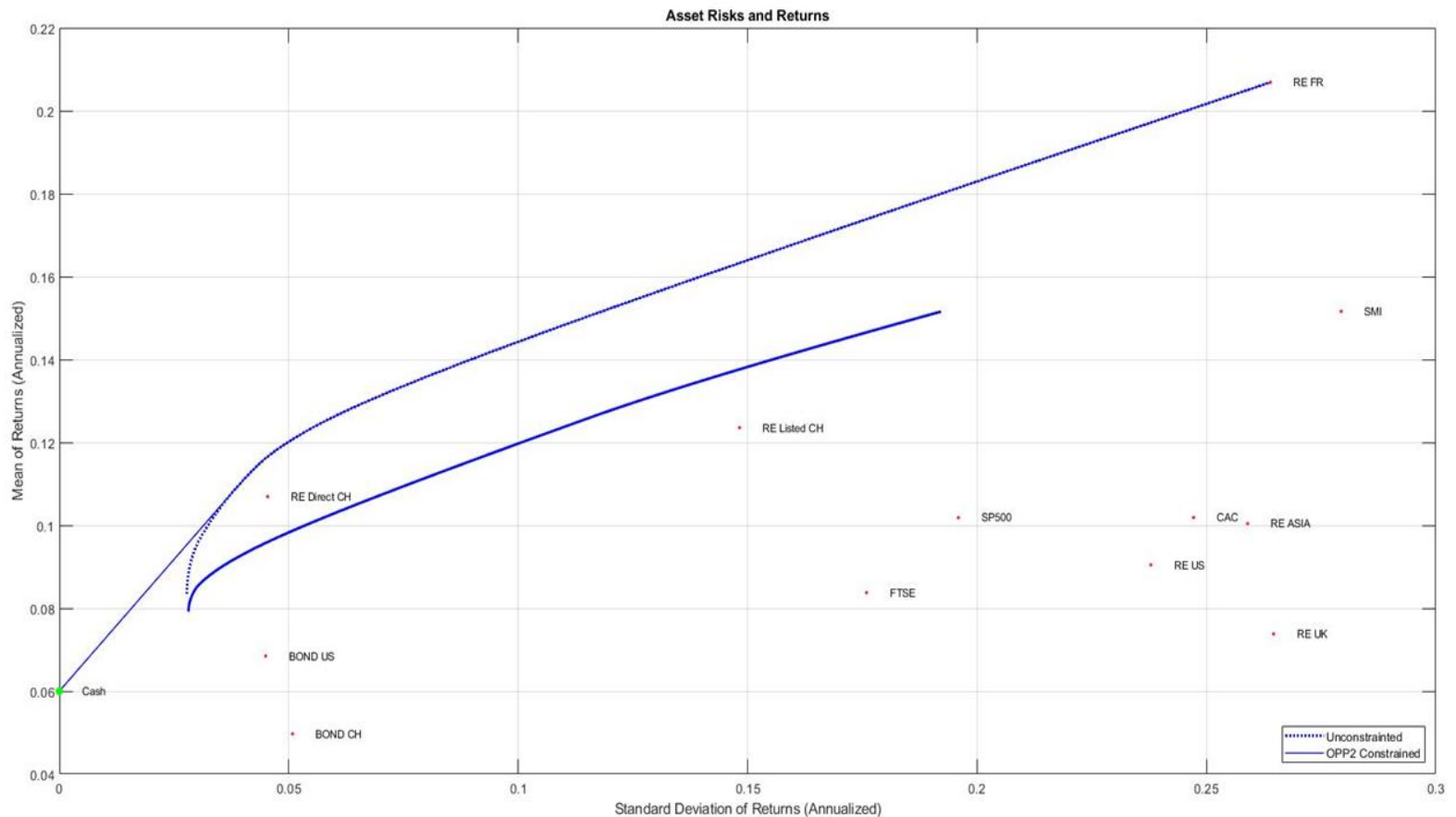
- **Art 55 - Allocation weight limits**

- ☐ 50% in stocks
- ☐ Between 15-30% for other asset classes
- ☐ **30% in real estate (maximum of 1/3 abroad)**

## 3

# Portfolio Construction under OPP2 Constraints

## 2. Efficient Frontier under OPP2 Constraints

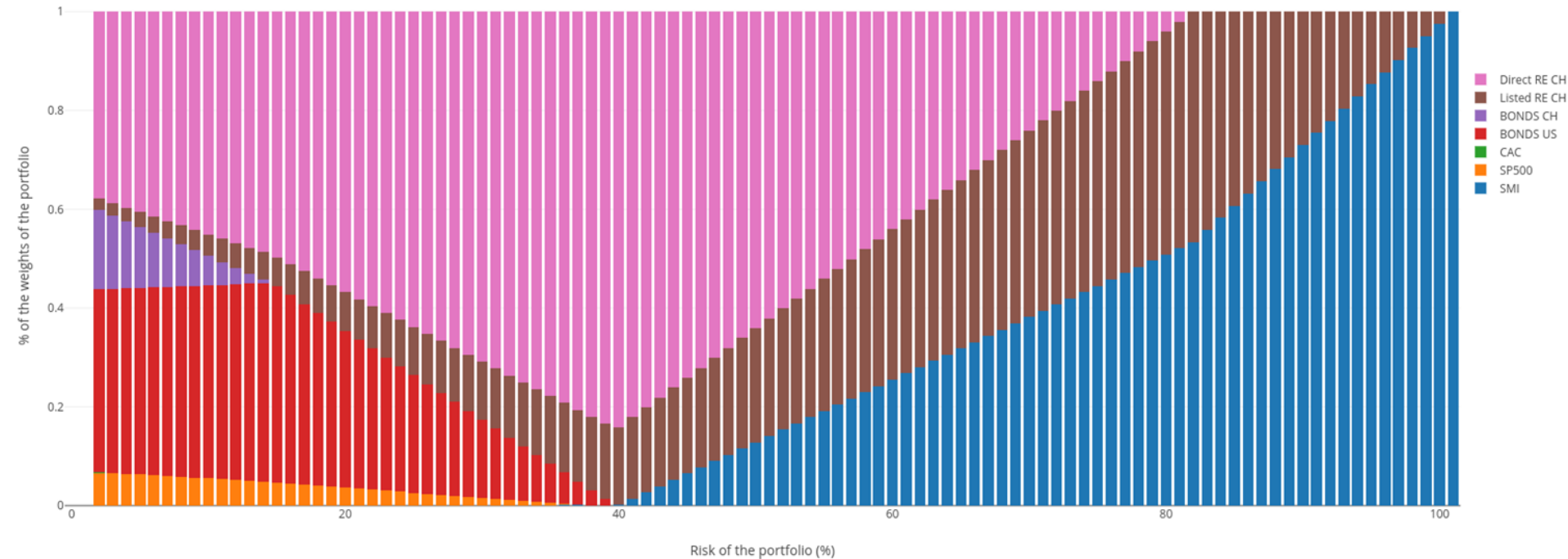


# 3

## Optimal portfolio weights

### 2. Efficient weights unconstrained

Optimal portfolio weights of the efficient frontier without RE FR (Unconstrained)

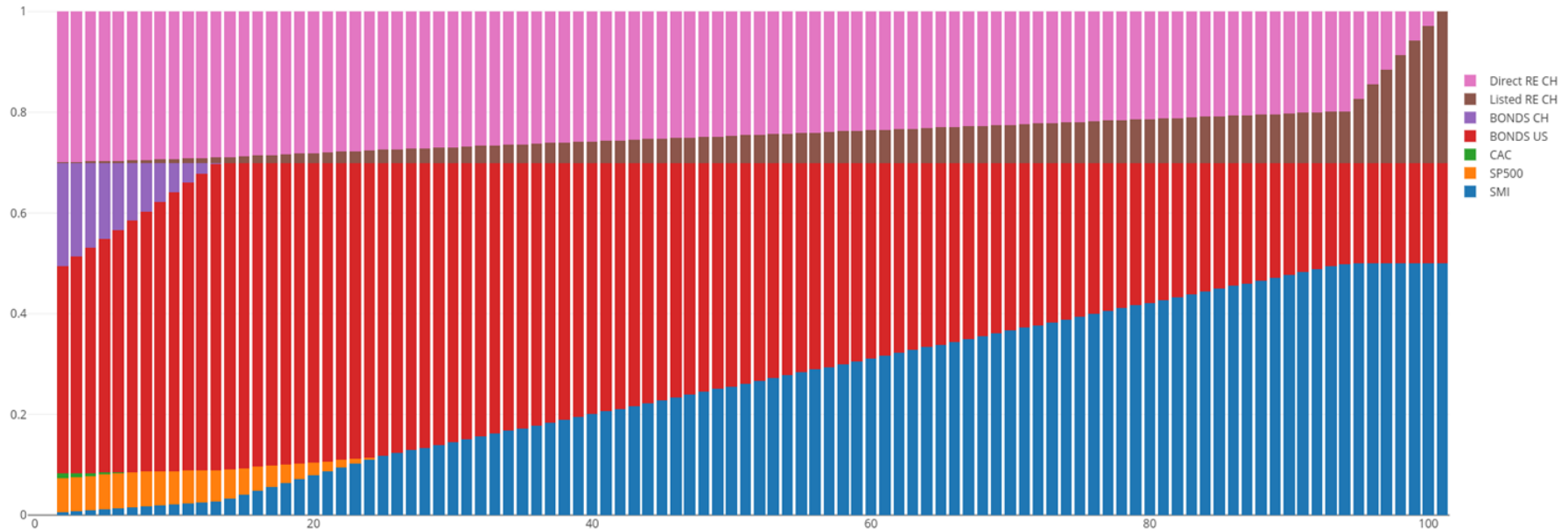


# 3

## Optimal portfolio weights

### 2. Efficient weights constrained

Optimal portfolio weights of the efficient frontier without RE FR (Constrained)

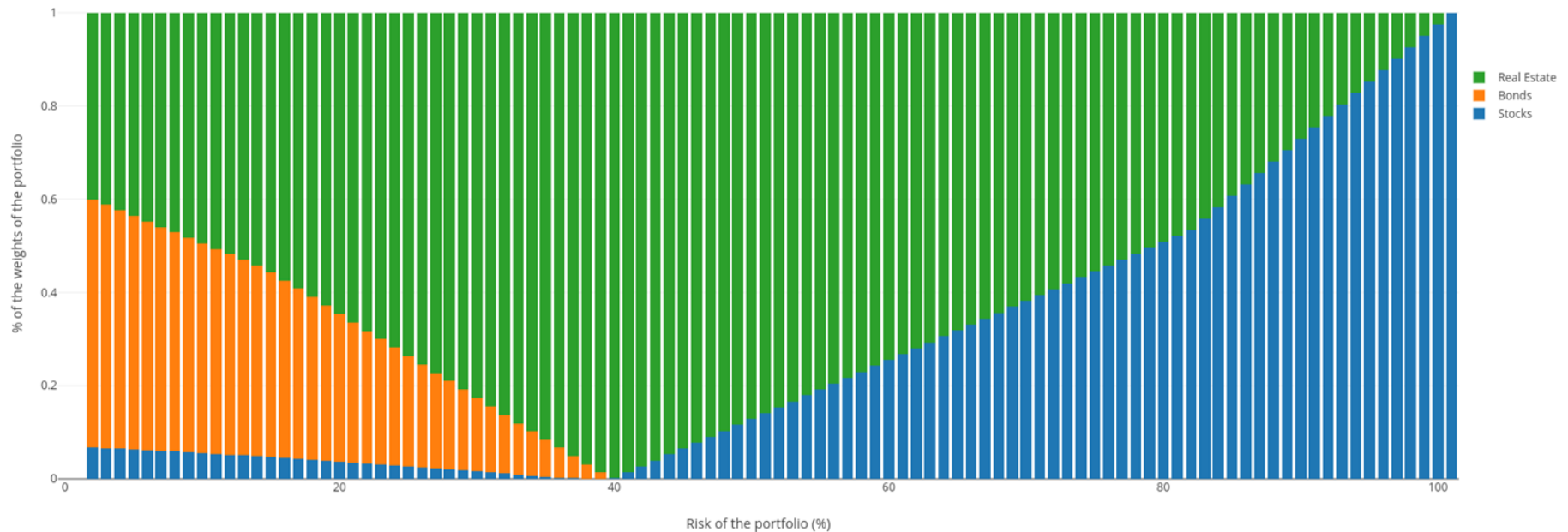


# 3

## Optimal portfolio weights

### 2. Efficient weights unconstrained (aggregated by asset class)

Optimal portfolio weights of the efficient frontier without RE FR, Aggregated (Unconstrained)

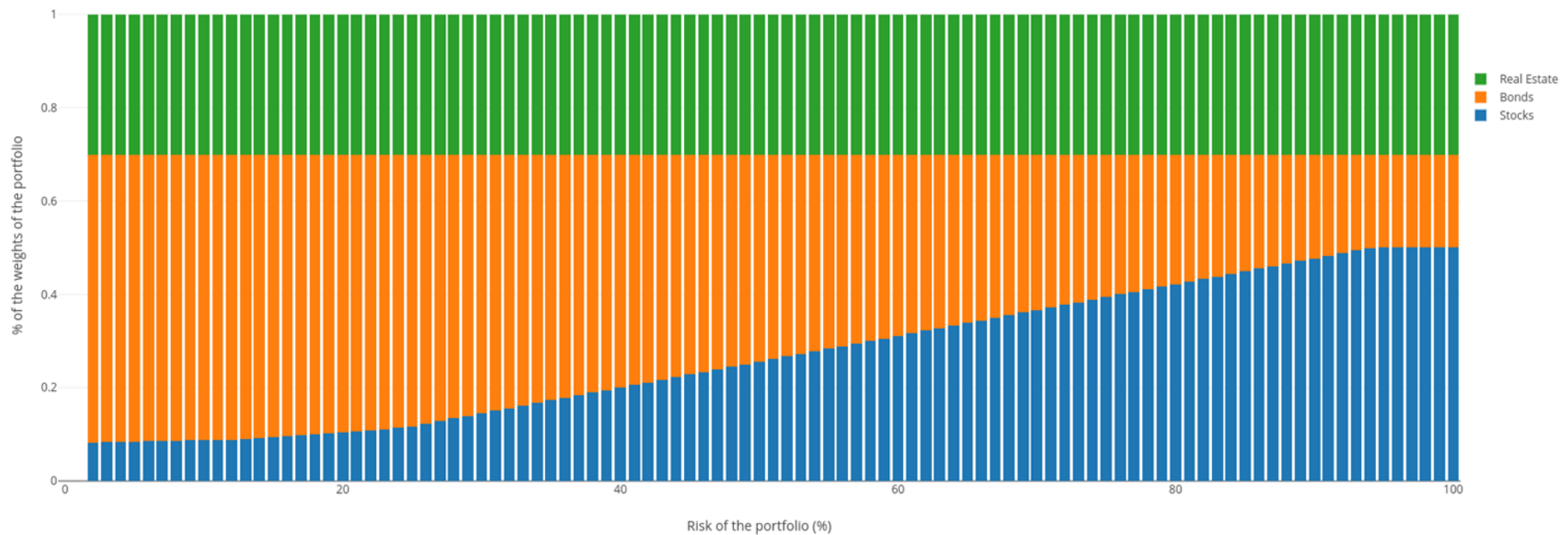


# 3

## Optimal portfolio weights

### 2. Efficient weights unconstrained (aggregated by asset class)

Optimal portfolio weights of the efficient frontier without RE FR, Aggregated (Constrained)

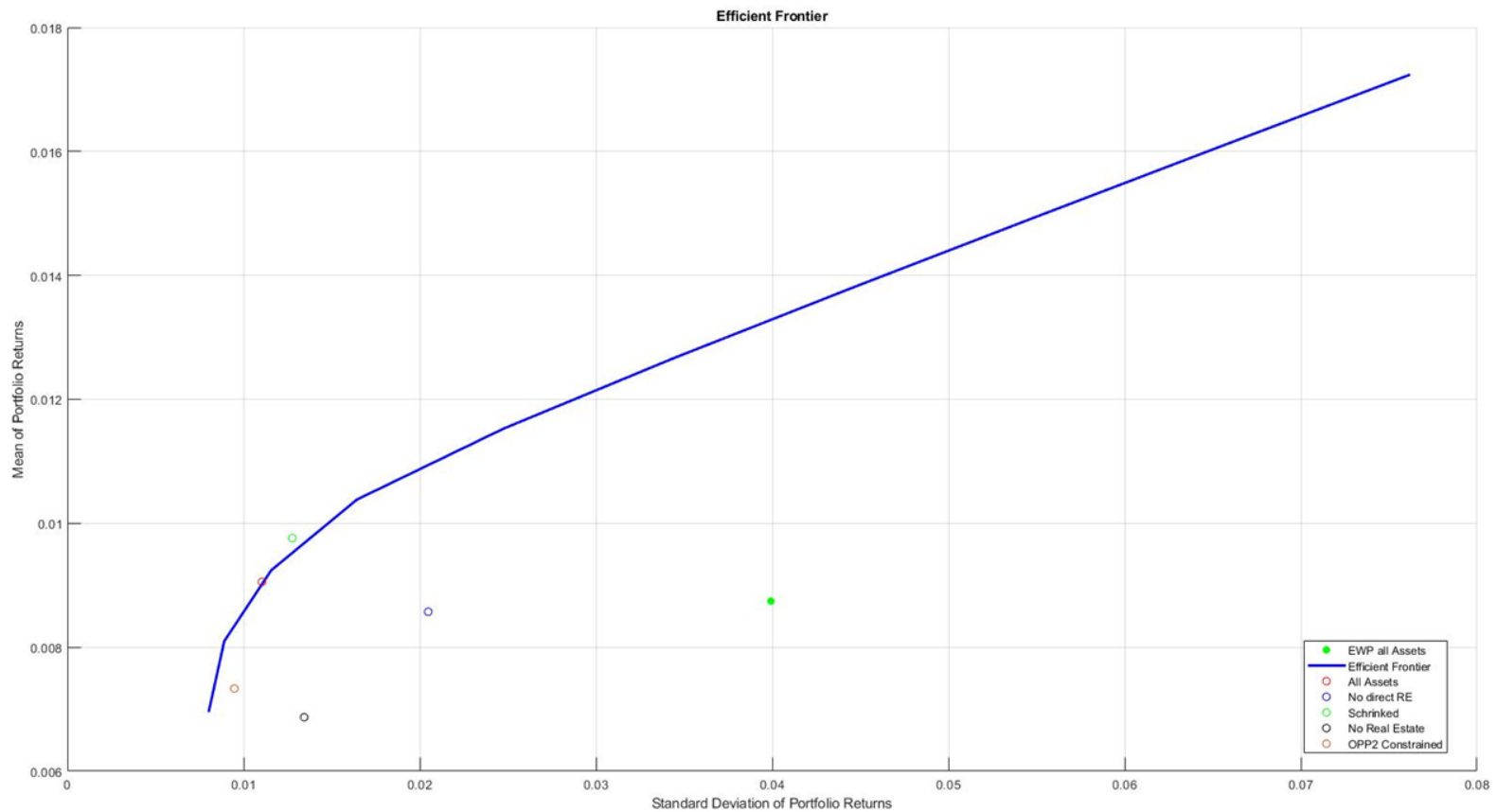




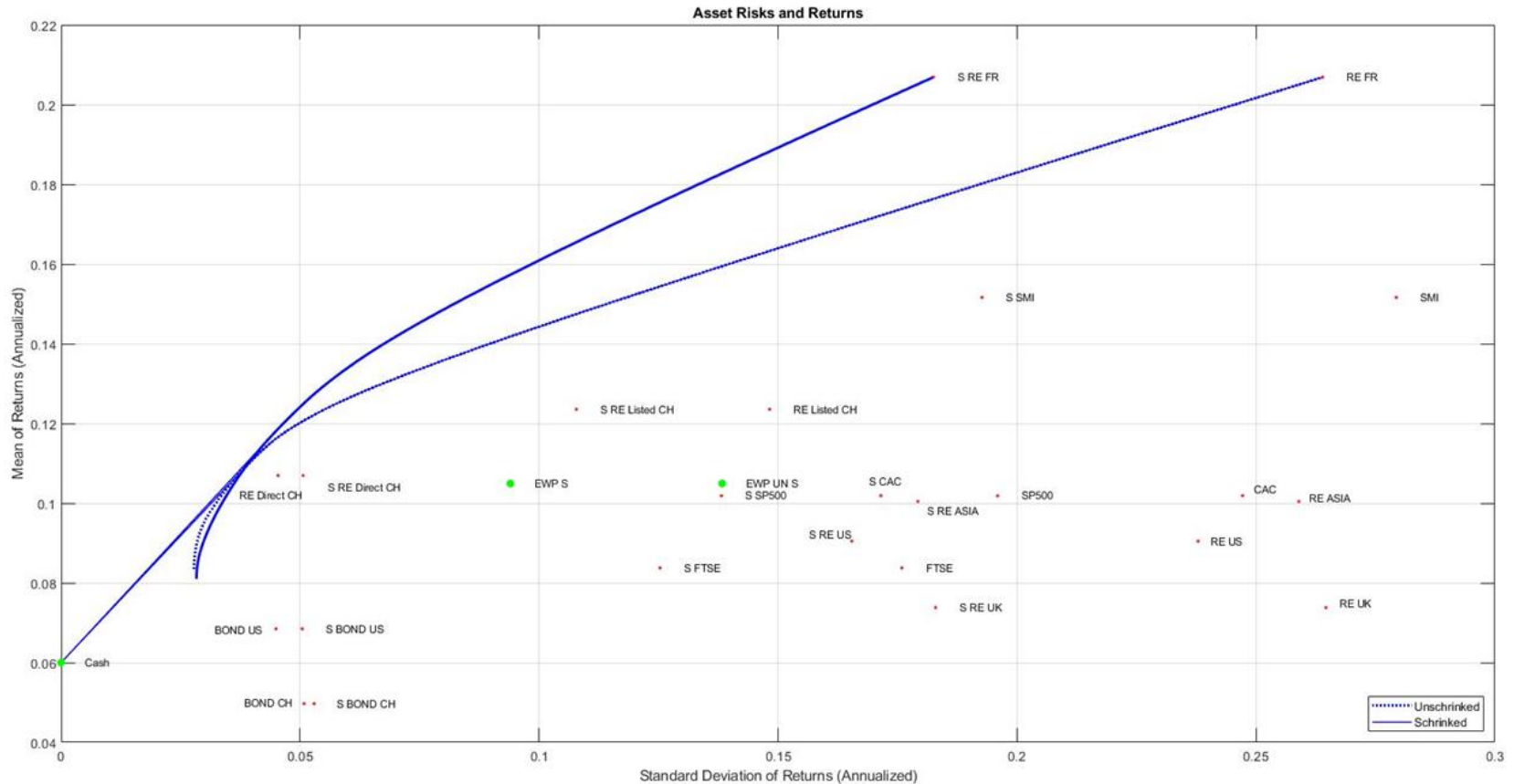
# 4

## Comparison & Results

### 1. Summary: All cases comparison



## Extension : Estimation errors



**THANK YOU FOR YOUR ATTENTION!**



Any questions ?



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