



# CONSEQUENCES ON MEASURING ADEQUACY AND SUSTAINABILITY IN SOCIAL SECURITY AFTER PANDEMIC

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# AGENDA

- Sustainability and Adequacy
- Indicators of Adequacy
- Adequacy of Italian Disabled Workers' benefits: a Case Study

# SUSTAINABILITY AND ADEQUACY

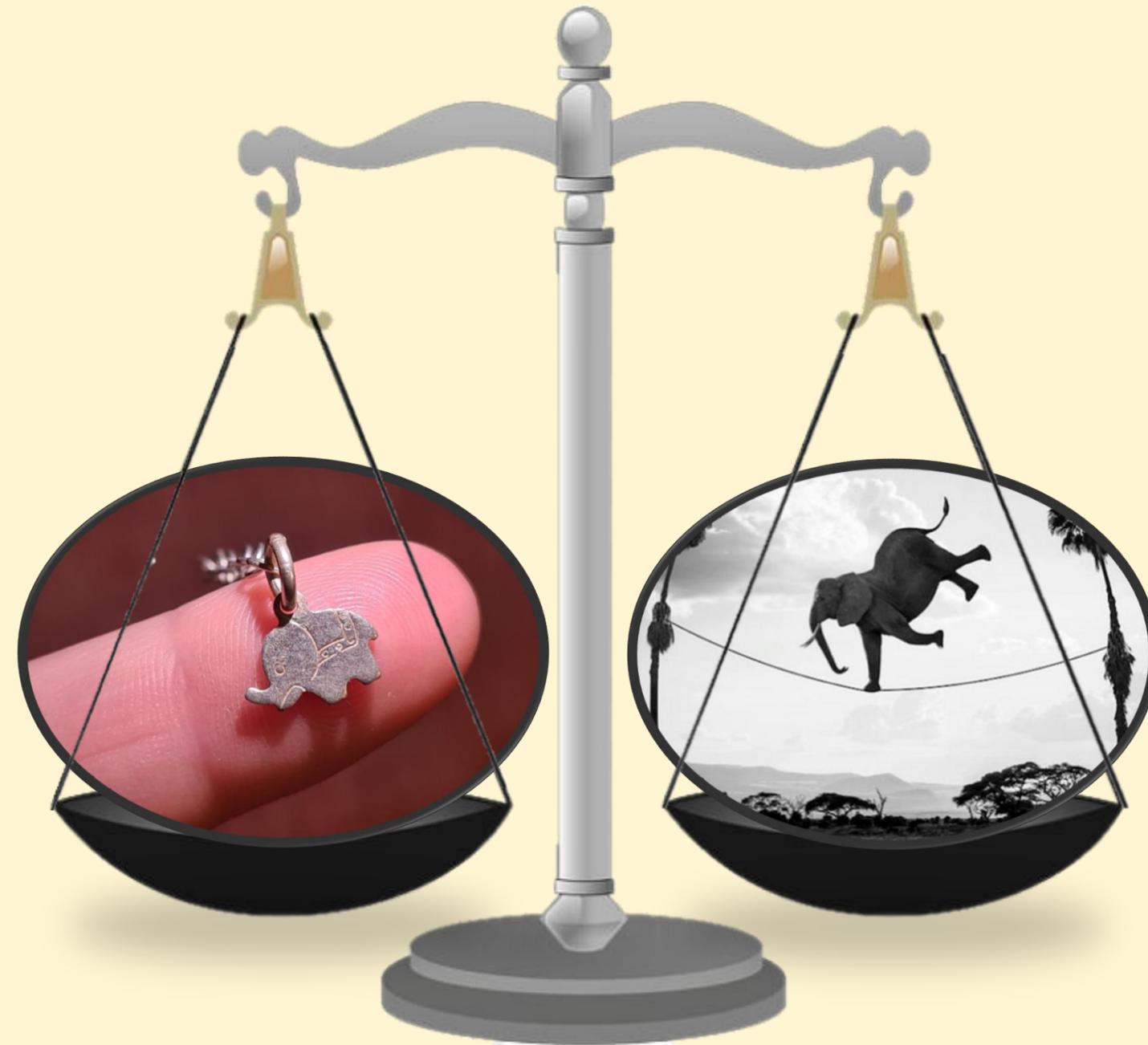
What is  
Adequacy?

# SUSTAINABILITY AND ADEQUACY



EP, 2015

“The ADEQUACY of pensions is measured by their ability to prevent poverty and by the degree to which they match the level of pre-retirement income”



IMF, 2022

“The SUSTAINABILITY of a public pension system may be defined as if it will not run into prolonged or permanent financing constraints over a long horizon”

# INDICATORS OF ADEQUACY

# INDICATORS OF ADEQUACY

## BIG MAC INDEX



$$BigMac_{Country\ x} = \frac{BigMacPrice_{Country\ x, Home\ Currency}}{BigMacPrice_{USA, USD}}$$

$$BigMac_{ITA, Jan2025} = 0,98$$

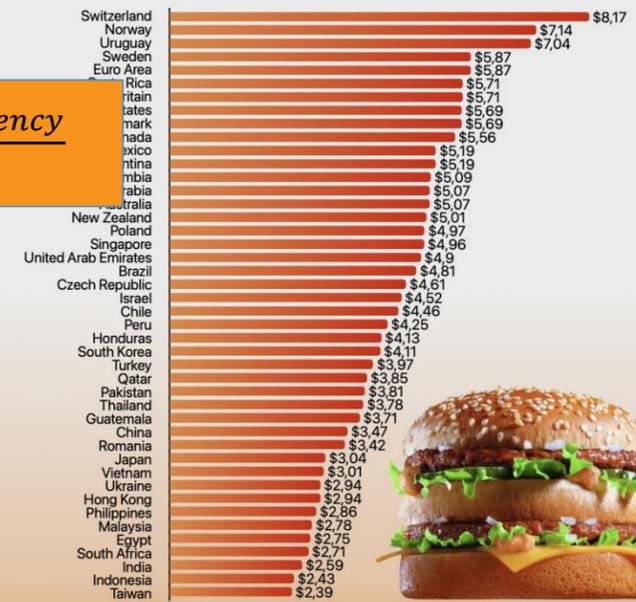
$$\frac{EUR}{USD} = 0,95$$

⇒ *EUR OVERVALUED*  
(Purchasing Power Parity)

The Economist

## The Big Mac Index

Worldwide price in US dollars of a Big Mac in January 2024 by country



Source : The Economist & Statista - January 2024

@tommydouziech

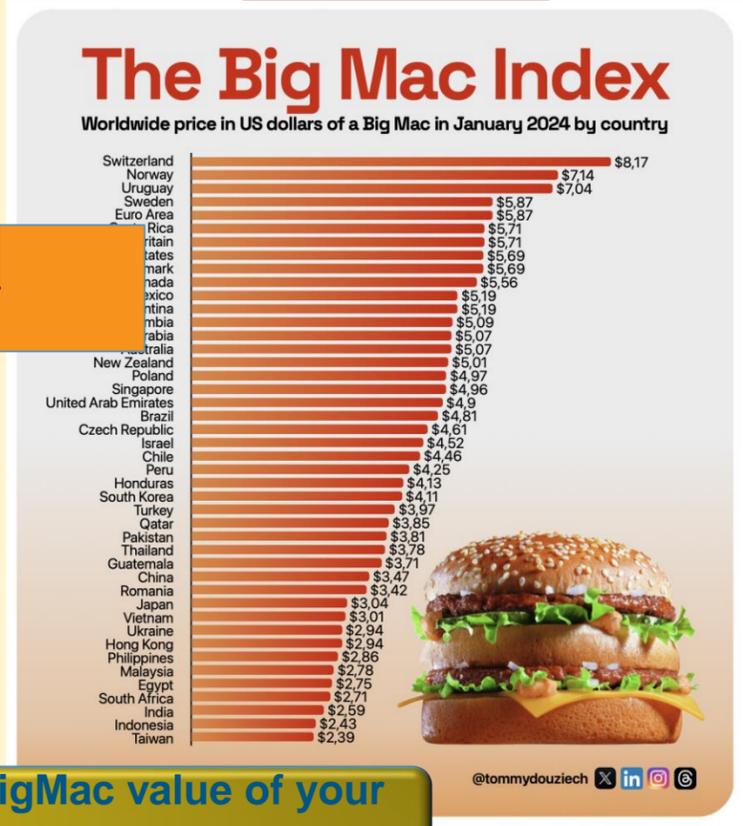
# INDICATORS OF ADEQUACY

## MODIFIED BIG MAC INDEX



$$BigMac_{Country\ x} = \frac{BigMacPrice_{Country\ x, USD}}{BigMacPrice_{USA, USD}}$$

The Economist



How many BigMac can you purchase in the USA with the BigMac value of your country?

# INDICATORS OF ADEQUACY

## BIG MAC INDEX FOR MONTHLY MINIMUM PENSIONS



$$BigMac (Min. Pens.)_x = \frac{Minimum Pension_{x,USD}}{BigMacPrice_{x,USD}}$$



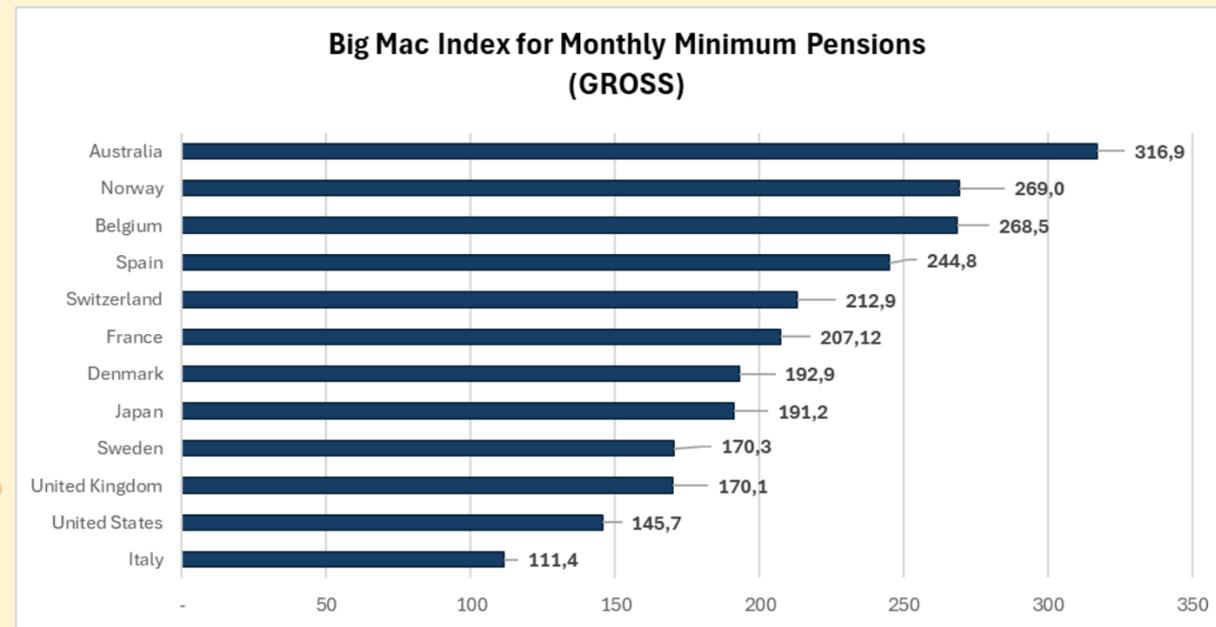
*GROSS*

*NET*

How many BigMac can you purchase with a monthly minimum pension in your country?

# INDICATORS OF ADEQUACY

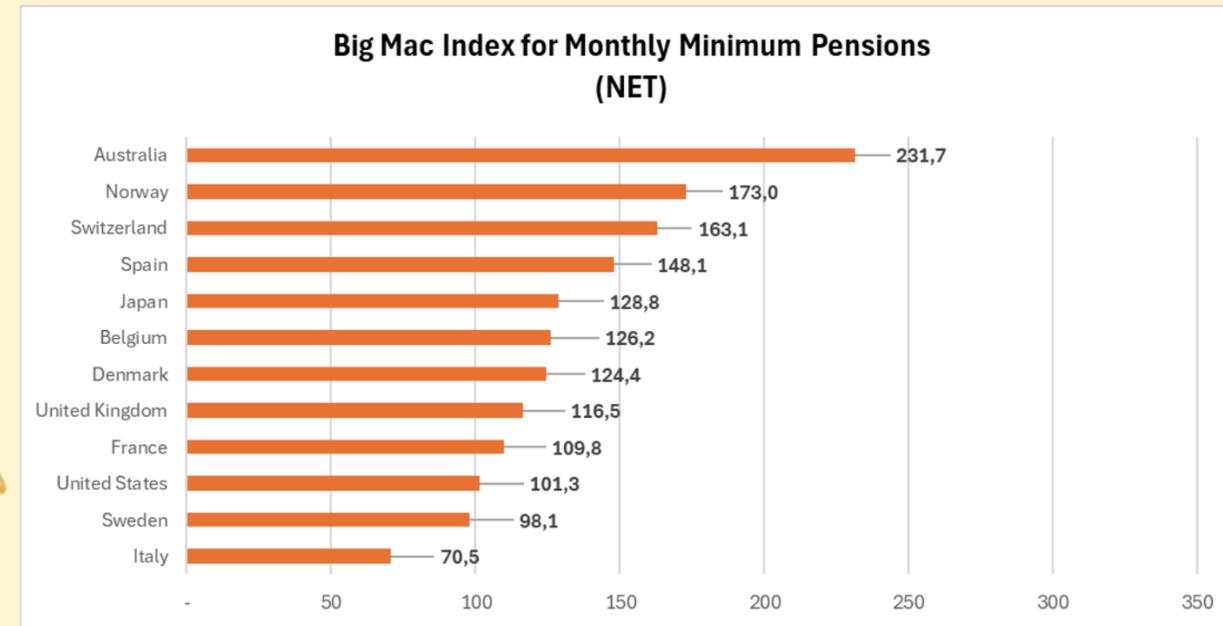
## GROSS BIG MAC INDEX FOR MONTHLY MINIMUM PENSIONS



How many BigMac can you purchase with the gross monthly minimum pension in your country?

# INDICATORS OF ADEQUACY

## NET BIG MAC INDEX FOR MONTHLY MINIMUM PENSIONS



How many BigMac can you purchase with the net monthly minimum pension in your country?

# INDICATORS OF ADEQUACY

## THEORETICAL REPLACEMENT RATE

$$TRR = \frac{P_{spa}}{W_{spa-1}}$$

GROSS TRR

NET TRR

- $TRR$  = *Theoretical Replacement Rate*;
- $spa$  = *standard pensionable age*;
- $P_{spa}$  = *annual Pension amount in the first year of retirement (at age  $spa$ )*;
- $W_{spa-1}$  = *pre-retirement annual Wage (at age  $spa-1$ )*

How many PreRetirement Annual WAGES you can purchase  
with your Annual PENSION

# INDICATORS OF ADEQUACY

## PENSION WEALTH

$$PW = \frac{\sum_{k=1}^{\omega} v^k p_{spa,k} P_{spa+k}}{W_{spa-1}}$$

GROSS PW

NET PW

$PW$  = Pension Wealth;

$spa$  = standard pensionable age;

$v$  = discount factor;

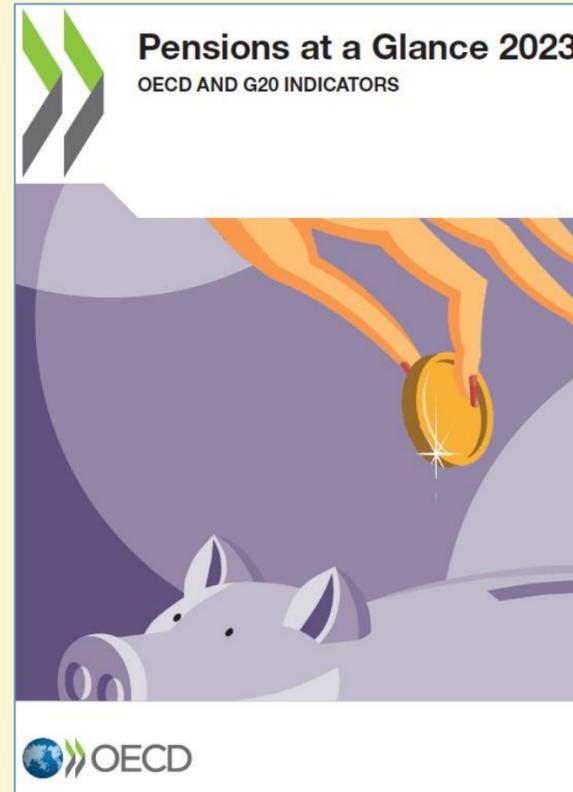
$p_{spa,k}$  = Probability that an individual who retired at  $spa$  will survive  $k$  years;

$P_{spa+k}$  = annual Pension of an individual who retired at age  $spa$  surviving after  $k$  years;

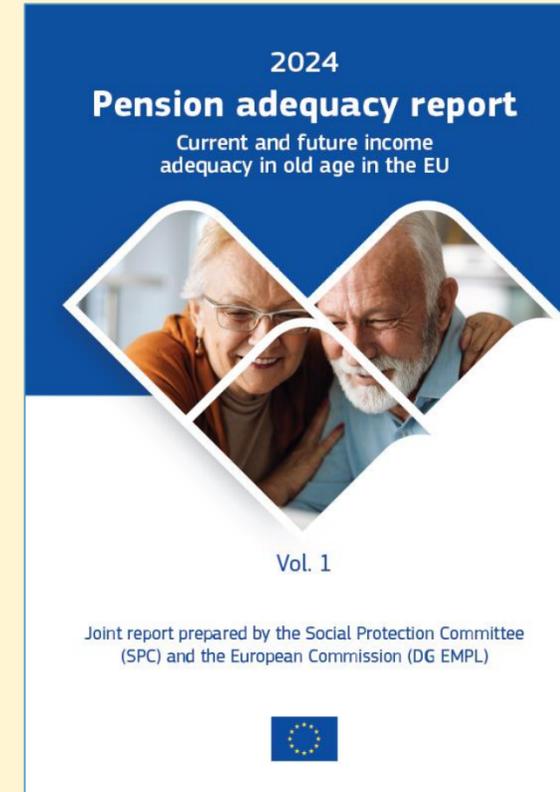
$W_{spa-1}$  = pre-retirement annual Wage (at age  $spa-1$ )

How many PreRetirement Annual WAGES you can purchase  
with the present value of your Life PENSION

# INDICATORS OF ADEQUACY



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# ADEQUACY OF ITALIAN DISABLED WORKERS' BENEFITS: A CASE STUDY

# ADEQUACY OF ITALIAN DISABLED WORKERS' BENEFITS: A CASE STUDY



A CASE STUDY  
ON THE  
DISABLED PENSION WEALTH INDICATOR

↓  
MISSING  
IN  
ACTUARIAL LITERATURE



# ADEQUACY OF ITALIAN DISABLED WORKERS' BENEFITS: A CASE STUDY



## Assumptions (OECD, EC, MOF<sub>ITA</sub>)

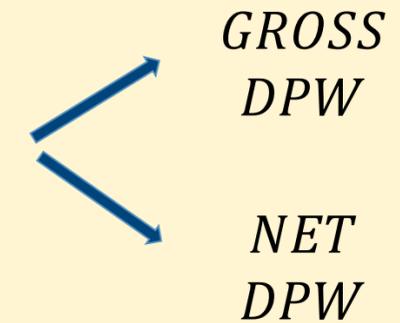
- ❑ **Career Length: 41 years (entry: 26y – retire: 67y)**
  - ❑ **Coverage:** Italian disabled workers included in the mandatory compensation program  
Aged 67 in 2023
  - ❑ **Demographic assumptions:** Inail disabled life tables, updated at 2019, 2021, 2023
  - ❑ **Economic assumptions:**
    - Price inflation = 2% per year
    - Real earnings = 1.25% per year on average
    - Discount rate = 2%
    - Average disabled workers' salaries
- ❑ **Taxes and Social security contributions:** As for by law respectively in 2019, 2021, 2023

# ADEQUACY OF ITALIAN DISABLED WORKERS' BENEFITS: A CASE STUDY



## DISABLED PENSION WEALTH

$$DPW = \frac{\sum_{k=0}^{\omega} v^k p_{spa,k} (P_{spa+k} + DB_{spa+k})}{W_{spa-1} + DB_{spa-1}}$$



*DPW* = Disabled Pension Wealth

Same as before plus:

$DB_{spa+k}$  = annual Disability Benefit of a disabled worker who retired at age *spa* surviving after *k* years;

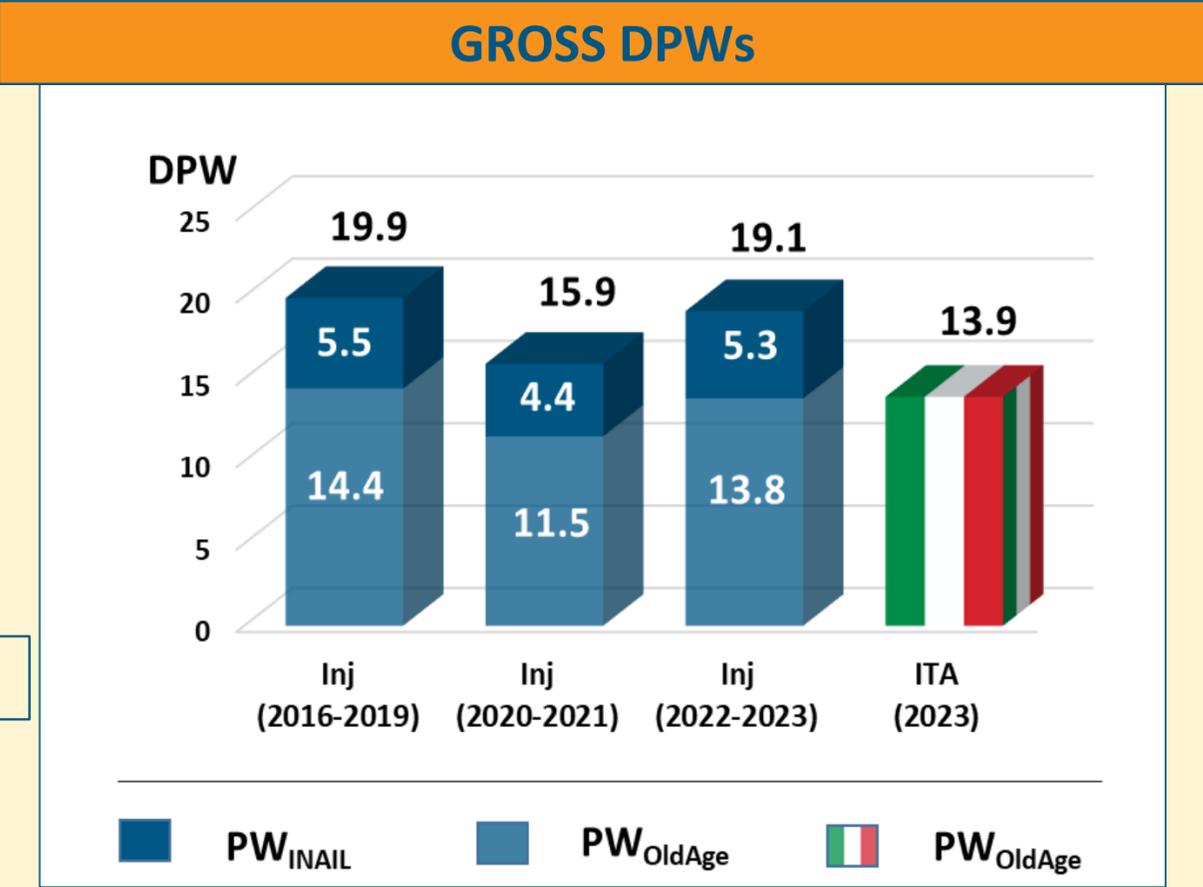
$DB_{spa-1}$  = pre-retirement annual Disability Benefit (at age *spa-1*)

How many PreRetirement Annual DISABLED EARNINGS you can purchase with the present value of your global Life “DISABLED INCOME”

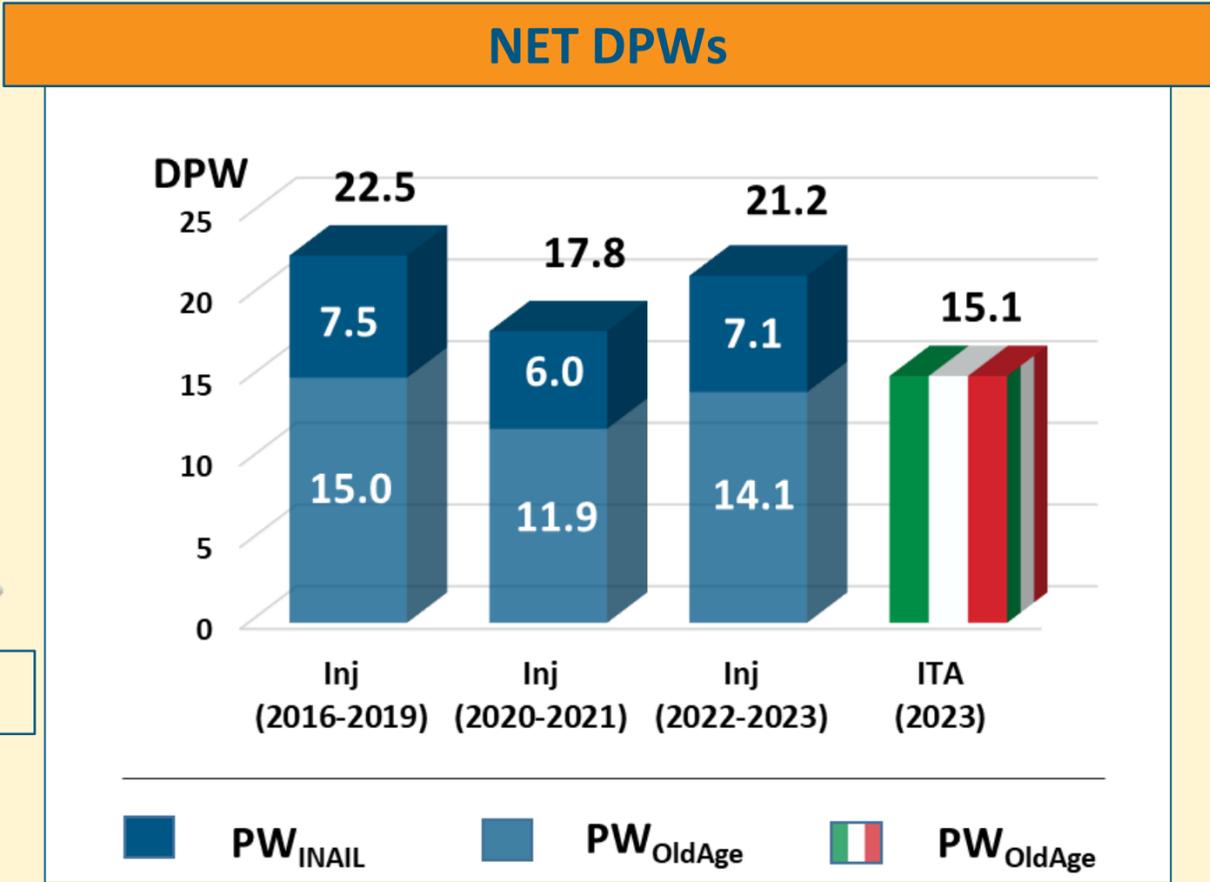
# ADEQUACY OF ITALIAN DISABLED WORKERS' BENEFITS: A CASE STUDY



16%-60%



# ADEQUACY OF ITALIAN DISABLED WORKERS' BENEFITS: A CASE STUDY



$$DPW = \frac{\alpha (P + DB)}{W_{spa-1} DB_{spa-1}}$$

**Gross DPW and Net DPW**  
16% - 60%  
Average Variations

$DPW_{INAIL}$	$DPW_{OldAge}$	DPW
<b>35%</b>	<b>3%</b>	<b>12%</b>

# ADEQUACY OF ITALIAN DISABLED WORKERS' BENEFITS: JUST FOR FUN



## BIG MAC INDEX FOR MONTHLY DISABLED PENSION



$$BigMac (Disabled)_{ITA} = \frac{P_{Disabled,ITA,USD} + DB_{ITA,USD}}{BigMacPrice_{Italy,USD}}$$

$$GROSS = 429.85$$

$$NET = 414.28$$

How many BigMac can you purchase with a monthly disabled pension in Italy?

**Thank you! Obrigado!**

**CONSEQUENCES ON MEASURING ADEQUACY  
AND SUSTAINABILITY IN SOCIAL SECURITY  
AFTER PANDEMIC**

**Questions?**

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