DETAILED LABOUR MARKET MODELLING WITH THE INFORUM MODEL INFORGE AND NEXT STEPS

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German Labour Market in Transition

- Number of unemployed persons declined from 4.5 million in 2005 to 1.5 million in 2018
- As a result, the challenges of the German labour market policy have changed:
  - Shortage of manpower in occupations
  - Impact of structural changes (e.g. digitalization, new mobility regimes, climate change, ...) stronger

- To meet these challenges the INFORUM-Modell INFORGE was significantly expanded to QINFORGE
  - QuBe-Projekt (qualifications and occupations in the future)
QINFORGE – An Overview

► Four interdependent blocks

⇒ 1 The demographic module records immigration from 150 countries, birth and mortality rates and immigration

⇒ 2 The education module depends on demographic change
   ▪ School, vocational training and studies
   ▪ Persons leaving the education system are allocated to occupations

⇒ 3 The module of occupational flexibility: transition from trained occupation to practiced occupation.

⇒ 4 INFORGE: labour demand on the sectoral and aggregated level; determined among others by demographic change

► Demographic change influences both sides of the labour market: Labour force and sectoral demand
QINFORGE – An Overview

1. Demography
   QuBe-population projection (German, Non-German, Age, Sex)

2. Labour supply
   - Education system
   - Choice in occupation (144 occupations)
   - Labour participation
   - Trained occupations (144 occupations)
   - Qualification

3. Occupancy
   - Occupational flexibility
   - Occupation held Labour force

4. Labour demand
   - Matching of 144 occupations
   - Wages & Prices
   - Occupations practised (144 occupations)
     Employment
   - 144 occupations in sector 1
   - 144 occupations in sector 63
   - Estimation of 4 requirement levels within each occupation
Labour Demand in QINFORGE (4)

1. Labour demand measured in hours (volume of work)

\[ \text{Volume of work}_{t,j} = f(\text{production}_{t,j}, wages_{t,j}, prices_{t,j}, \text{trend}) \]

- **Wages**
  - Overall level of wages
  - Nominal production (turnover) per hours worked

- **Prices**
  - Unit cost:
    - Intermediate demand, labour, depreciation per unit of production

- **Production**
  - Intermediate demand
  - Consumption
  - Investments
  - Exports and imports

\[ \Rightarrow \text{productivity (production per hour) is a result} \]

2. Sector specific labour demand by occupation k (\(Ldo\))

\[ Ldo_{t,j,k} = f(\text{wage}_{t,k}/\text{wage}_{t,j}, \text{volume of work}_{t,j}, \text{trend}) \]
Results: Total Labour Market: ③ → ← ④

- Working population, labour force and employed persons in Germany from 1991 to 2035, projection as of 2017

Labour demand is restricted by the supply side

- Unemployed persons: 1.4 Million
- 2.5 rate of unemployment
Results: Construction (Supply Side → ③)

- Labour supply by construction occupations and its share in total labour supply

- After 2020 the number of persons in construction occupations shrinks, due to shifts in wages and demographic change
Results: Construction (Demand Side → 4)

- Number of persons employed in the construction industry in Germany from 1991 to 2035

- After 2020 the number of households looking for housing grows less than before → investment in construction and employment shrinks
Results: Construction Labor Productivity

- Development of productivity per hour in construction 1991 to 2035

The development of productivity depends on the final demand and the result of the labourmarket.
Conclusion

► Demographic development is changing the supply and demand of labour simultaneously.

► Both sides of the market in an econometric structural model should therefore react to changes in population trends.

► Job-specific ageing and changing career choices lead to an acceleration or deceleration of the demographic transition of job-specific supply.

► The construction industry shows that both influences have an effect on this specific labour market at the same time.
More detail at regional level:

(1) Labour markets: 34 regions, defined by minimal commuting between these 34 regions:
   - Disparities between regions may grow
   - To make impacts of structural change visible

(2) Discussion on multi-region IO-tables at federal state level (16)
   - Intra-national trade flows help to explain disparities

One step on „the bridge“ from macro to micro level

- Integrate surveys and process data of the labour market into IO-models

Next steps:

- Implement Micro data?: looking for corporate data
- How to use „big data“ in IO-models? (Italy, Austria, ... already using job advertisements)
News: From QINFORGE to QMORE

Flows of information

Concistency:
Aggregated Regions equal to national level

Region A

Demography

Services and goods of public interest („Daseinsvorsorge“)

Sectors with contact to lager markets

Sectors driven other sectors

Region B

Demography

Services and goods of public interest („Daseinsvorsorge“)

Sectors with contact to lager markets

Sectors driven other sectors

National or international markets for goods and services
IO-Modellbilder face new challenges: much more data!

IO-Models are able to integrate micro-data (aggregated)

- IO-models have linkages to surveys (consumption, labour, corporations, ...)
- IO-Models are like an „economic landscape“ and each survey have a certain position in this landscape
- Position can be measured relative to GDP

INFORUM-Models are able to use more detailed data

- A lot of examples (Italy, US)

And: Interdyme is able to handle a huge amount of data

- VAM-files combined with meta-data
Thank you for your attention!

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Back up
Investment

Growth rates, five year average
Construction in constant prices

Growth rates

In Billion Euro


-4 -3 -2 -1 0 1 2 3 4

-4 -3 -2 -1 0 1 2 3 4 5 10 20 50 100 200 350